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*Baltimore Health Dept.*

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# ANNUAL REPORT

— OF THE —

## SUB-DEPARTMENT OF HEALTH,

DEPARTMENT OF PUBLIC SAFETY,

— TO THE —

MAYOR AND CITY COUNCIL OF BALTIMORE,

— FOR THE —

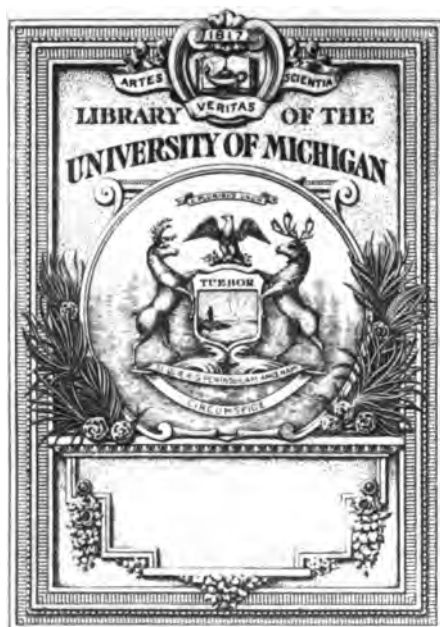
*Fiscal Year Ended December 31, 1902.*



BALTIMORE :

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*Commissioner of Health.*

C. HAMFSON JONES, M. D.,

*Assistant Commissioner of Health.*

SYDNEY O. HEISKELL, M. D.,

*Assistant Commissioner of Health (Quarantine).*

THADEUS W. CLARKE, M. D.,

*Assistant Quarantine Physician.*

J. W. M. KIGER,

*Secretary Department of Health.*

ARTHUR D. THOMPSON,

*Assistant Secretary Department of Health.*

WILLIAM ROYAL STOKES, M. D., *Bacteriologist.*

GUSTAV W. LEHMANN, PH. D., *Chemist.*

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HARRY C. ANDREWS, *Permit Clerk.*

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HERMAN M. NORTH and AUGUST RITTMILLER, *Drivers of Funeral Wagon.*

JOHN B. WEILAGE, MORTIMER BYE, GROVER BENSER and GEORGE KARL,

*Laboratory Assistants.*

J. CHARLES ROEMER, *Messenger.*

## LIST OF HEALTH WARDENS.

---

- First Ward*—J. W. WILLIAMS, M. D.  
*Second Ward*—J. A. SCHULTE, M. D.  
*Third Ward*—C. M. SCHULTE, M. D.  
*Fourth Ward*—THOS. SUDLER, M. D.  
*Fifth Ward*—F. A. SAUER, M. D.  
*Sixth Ward*—A. C. HEARN, M. D.  
*Seventh Ward*—A. S. GAGE, M. D.  
*Eighth Ward*—J. W. FRANCE, M. D.  
*Ninth Ward*—H. Y. WESTBROOK, M. D.  
*Tenth Ward*—J. F. HEMPEL, M. D.  
*Eleventh Ward*—CLAUDE VAN BIBBER, M. D.  
*Twelfth Ward*—T. L. RICHARDSON, M. D.  
*Thirteenth Ward*—D. S. WILLIAMS, M. D.  
*Fourteenth Ward*—A. G. BARRETT, M. D.  
*Fifteenth Ward*—J. L. RIDGELY, M. D.  
*Sixteenth Ward*—M. K. WARNER, M. D.  
*Seventeenth Ward*—H. D. LEWIS, M. D.  
*Eighteenth Ward*—R. A. WARNER, M. D.  
*Nineteenth Ward*—M. G. SMITH, M. D.  
*Twentieth Ward*—H. J. HAHN, M. D.  
*Twenty-First Ward*—A. D. DRISCOLL, M. D.  
*Twenty-Second Ward*—A. T. CHAMBERS, M. D.  
*Twenty-Third Ward*—H. LEE FRANKS, M. D.  
*Twenty-Fourth Ward*—L. J. TURLINGTON, M. D.

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REPORT  
— OF THE —  
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# REPORT

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SUB-DEPARTMENT OF HEALTH,  
DEPARTMENT OF PUBLIC SAFETY,  
CITY HALL ANNEX.

BALTIMORE, MD., January 1, 1903.

*To the Honorable the Mayor and*

*City Council of Baltimore:*

GENTLEMEN—In accordance with the requirements of law, I have the honor to submit the report of the Sub-Department of Health for the year ended December 31st, 1902. The death rate for the whole population, white and colored, was 19.53 per thousand, compared with 19.63 for 1901. The deaths included 4,072 white males, 3,661 white females; 1,274 colored males, and 1,246 colored females, a total of 10,253. The death rate per thousand of our white population was 15.32, while the death rate of our colored population was 31.50, more than double that of the white population. The births reported, returns incomplete, were: white males, 3,653; white females, 3,540; colored males, 874; colored females, 883; total 8,950. Still births, 659. The birth rate per thousand of population was: white, 16.17; colored, 21.96; for the entire population 17.05. It will be seen that while the death rate among the colored population was more than double that of the white population, the birth rate of the former was 26 per cent. greater than that of the latter. The deaths in public institutions were 1,885. 1,072 coroners' inquests and 83 official autopsies were held. Marriages reported, 5,135.



## SMALLPOX.

It seems to me fitting at this time to refer you to the smallpox situation—past and present, so that you might fully appreciate the work of the Health Department in keeping the city free from the disease.

I claim that the record of only seventy-eight cases of smallpox, from January 1, 1899, to December 31, 1902, in a city consisting of 525,000 people, 80,000 of whom are negroes (who contract the disease more readily than whites), is a record that should give us great confidence in our ability to cope with the disease.

In order to show that our city has been exposed to danger for a number of years, I submit a list of States invaded by smallpox, as given in the weekly bulletins issued by the United States Marine Hospital Service, commencing January 1, 1898:

Alabama.....	January 1	Arkansas .....	March 1
North Carolina....	" 12	New Jersey.....	" 4
South Carolina....	" 15	New Mexico.....	" 5
Georgia .....	" 17	Louisiana .....	" 13
Florida.....	" 24	Ohio.....	April 8
Tennessee .....	" 24	Pennsylvania .....	" 13
Virginia .....	February 1	Illinois.....	May 4
Texas.....	" 2	New York.....	" 14
Kentucky .....	" 3	Wisconsin .....	" 19
Massachusetts....	" 5	Colorado.....	June 24
Dist. Columbia....	" 7	Kansas .....	September 15
Michigan .....	" 12	California .....	November 7
Mississippi .....	" 15	Iowa .....	" 26
West Virginia....	" 15	Oklahoma. ...	December 8
Indiana .....	" 26	Arizona.....	" 16

You will observe that during the year 1898 cases of smallpox were reported to be in thirty States and territories.

We were most concerned in the fact that the disease was menacing Baltimore, by the cases developed in Virginia,

West Virginia and Pennsylvania, especially by the migration of negroes. The health officials had now no doubt that Baltimore would soon be invaded; indeed, it is marvellous that a case of smallpox had not already been in the city.

To show still further the pandemic of smallpox, I will add the following from the United States Marine Hospital weekly reports, which shows the minimum number of cases.

The year 1899 added thirteen states to the above list. The grand total of cases for the year was 11,136. The year 1900 added five more States and territories, making forty-eight in all; the grand total number of cases for the year was 20,362. The year 1901 added one more to the list, making forty-nine States and territories infected, with a total number of cases for the year of 48,206. The year 1902 showed for the year 54,014 cases. During the four years we find every State and territory invaded.

## SUMMARY.

Year.	Cases.
1899 .....	11,136
1900 .....	20,362
1901 .....	48,206
1902 .....	54,014
<hr/>	
Total ... ..	133,718

The epidemic in Baltimore in 1882-'83 caused the Mayor and City Council to pass ordinances giving extraordinary powers to the Commissioner of Health in times of imminent danger from disease. Ordinances requiring all persons to be vaccinated, at least once before one year old, and afterward when deemed necessary by the Commissioner of Health, were passed. Physicians were paid by the city, year by year, to go carefully over every ward, to see that every one was vaccinated. How well the people had obeyed their own laws was soon to be demonstrated.

The first case of smallpox was reported to the Department in January, 1899, by the physician stationed at Fort McHenry. A suspicious eruption had appeared in a recruit (white man), who had just arrived from Rochester, N. Y., where he had enlisted. The eruption was not typical, but because it was believed that the man had been exposed to smallpox in Rochester, it was considered best to use the same precautions as in cases of smallpox. Very soon an undoubted case was reported by the United States Marine Hospital office on Lombard street, which was then in charge of Dr. George Purviance. This man had had an eruption for four days, during which time he had been in various resorts of Marsh Market Space. The Health Department at once transferred the patient to Quarantine, and on the same night, with police protection, visited all the dance houses (negro) in the Space, and in the immediate neighborhood. Nearly 500 persons were vaccinated. It was discovered that a large proportion of the negroes had never been vaccinated before.

When a case of smallpox was discovered, the people in the neighborhood were vaccinated, and the reports of the physicians in charge of the vaccination squads show that 25 per cent. to 75 per cent. of the people vaccinated by them had never before been vaccinated. The finding of seven cases of smallpox in one week, coupled with the above reports from the vaccine physicians, determined the Health Commissioner to order a general vaccination.

After one month's work the services of the thirty extra vaccine physicians were dispensed with, and the regular force of twenty two vaccine physicians continued the work in all parts of the city. In this we were ably assisted by the free dispensaries, which were supplied with virus by this department.

It was considered wise to fortify the city still further by requesting that the officers of the Post-Office Department and the Police Department be vaccinated. This was at once complied with.

As shown by the report of the department for 1899, over 60,000 were vaccinated by the officers of the department (fifty-two vaccine physicians and many dispensaries) during the month of March, and judging by the amount of virus sold during that time, as many more were vaccinated by private physicians:

TABLE OF CASES FOR FOUR YEARS.

Month.	Years.				
	1899.	1900.	1901.	1902.	Total.
January .....	2	..	3	..	5
February.....	2	..	1	14	17
March .....	7	..	4	3	14
April .....	2	9	1	3	15
May .....	3	2	2	5	12
June .....	..	3	1	..	4
July.....	1	1	..	1	3
August .....	..	1	..	..	1
September .....	..	..	..	2	2
October .....	..	..	..	..	..
November .....	..	..	..	..	1
December.....	1	1	1	1	4
Total .....	18	17	14	29	78

From time to time (as shown by the table) a case of small-pox would be discovered within the city, but the first real test of the degree of protection enjoyed by the citizens through vaccination was not given until March 28, 1899, when the department discovered a case of smallpox at 615 Wayne street. The case had developed in a young negro, who was a waiter or porter on one of the railroads. When first seen by the department officials he was in the last stage of desquamation; he was just recovering from a mild case of smallpox. This case had been diagnosed as a case of black measles, and every day,

with the exception of a couple of days previous to the eruption, he had been going about his portion of the city, and associated with many people. Fortunately, however, that section of the city had been "gone over" by the vaccinating squads three times before the case was reported. No case developed from it.

Perhaps the severest trial came in the last part of January and the first part of February, 1902. On January 24th, 1902, the steamship "Vedamore," of the Johnstone Line, arrived from Liverpool, England, which was a non-infected port. She came in with all hands well. On the way over, (about ten days out,) one of the cattlemen died of "peritonitis," as shown by the captain's book. On February 2d the Health Department received a message from the University of Maryland Hospital that there was a suspect in their wards. Upon investigation the suspicions of the physicians were found correct, and the colored patient, Benjamin Hawkins, was removed to quarantine. We ascertained from him that he was a cattleman from the steamship "Vedamore." He also told us about the dead man buried at sea. His description of the case, added to his own case, made us believe that the man who died at sea of "peritonitis" really had died of smallpox. We ascertained that owing to the fog and ice the steamship "Vedamore" had not sailed (as scheduled) that day; so we found her at Locust Point loaded with cattle ready to sail. All of the cattlemen who came over and landed January 24 had scattered. As the vessel had already been thoroughly cleaned up, we vaccinated the officers and crew, (about sixty-five), and allowed the vessel to go the next day. The cattlemen we looked for on the steamship "Vedamore," and found scattered, were found in the city in various places from February 3 to 11, as they developed smallpox. Seven men in all thus developed the disease, and they, while in the city, went about with their clothes undoubtedly infected, as they had not changed clothing since they had buried the man at sea. In spite, how-

ever, of all the exposure, there were but three cases developed from them. The first was found on February 17, (a white boy,) the second on February 22d, and the third on February 26; none of these had been vaccinated. The last two cases developed in men who had been in contact with the men of the steamship "Vedamore." This fact was discovered by the vaccination squads, and immediately the men were placed under guard in the detention house, situated in the centre of the city, to await developments. The value of this house for the guarding and observing of men who have no homes in the city, and who had been exposed to possible infection, has been shown time and again. By this precaution seven cases of smallpox have been prevented from developing within the city, where they might have remained (in sailor boarding-houses, etc.,) for several days before detection, and thus produced many foci of infection.

It is highly gratifying to find that out of the seventy-eight cases handled by the Department less than a dozen cases were actually contracted within the city. It is also of great interest to note that every one of these patients had never been vaccinated, except George Wilson, (May 9), who had been vaccinated forty-five years ago.

We believe that the freedom from an epidemic of smallpox for four years by our city has been due:

First—To vaccination, which was begun long before cases had been contracted within the city, and persistently carried out during the entire time.

Second—To discovery of cases when the eruption had been out but a short time. In this we were well assisted by the patrolmen of our Police Department, who detected cases of suspicious eruption in people in the streets, and held them until inspected by the Health Department officials. In this way several cases of smallpox were found. The patrolmen's

services were especially good when they apprehended Edgar Stott, colored, about 1 A. M. February 11, 1902. This man had just arrived at Camden Station, he having been sent from a railroad camp, to where he had gone from the steamship "Vedamore." When he was seen that night by the Health Department officer, he showed an eruption about ten days old, the virulence of which is evidenced by the fact that four cases of smallpox developed in people (not citizens) who were in the same passenger coach with Edgar Stott, but no case was contracted in the city from him.

Third—To the quick removal to Quarantine of cases after diagnosis was sure.

Fourth—To re-vaccination of *all* people, not only in the house where the case developed, but also in houses in the neighborhood; also all people with whom the sick one came in contact with while he was going about the city.

Fifth—To the use of the detention house, where seven suspects developed smallpox.

Sixth—To the complete fumigation and cleansing of house, clothing, etc. This, in some instances, required destruction by burning.

Seventh—To the hearty co-operation of the physicians, who never hesitated to call upon the department for assistance in cases of disease showing eruption simulating smallpox.

Eighth—And by no means the least, to the department concealing nothing from the daily press. Our papers kept the people well posted of exactly what was occurring. The evidence thus produced doubtless caused many people to be vaccinated by their physicians, when advised to do so by the department through the papers.

I also believe that in addition to the above eight factors concerned in preventing an epidemic of smallpox, we have been greatly assisted by the excellence of the work of our State Board of Health, through its secretary, Dr. John S. Fulton. By his work, coupled with local health officers, outbreaks in various portions of the State have been well handled, and cases of smallpox have been prevented from wandering into the city. The city has helped some in this work, by opening our Quarantine Hospital for the reception of cases that could not well be cared for otherwise.

We are prompted to present the above account of smallpox in this city, not by a spirit of vain boasting, but to show what can be done when the people work in harmony with their Health Department. We know that we are by no means out of danger (because smallpox is yet abundant elsewhere,) yet we feel more than ever confident that there is no possibility of an epidemic of smallpox, even of small proportions, in this city, if the citizens are vaccinated once successfully, and re-vaccinated when advised to do so by the health officials.

Attention is called to some observations of Dr. William Royal Stokes, Bacteriologist of the Health Department, on the pathology of smallpox, and the accompanying microphotographs obtained from cases treated at the Quarantine Hospital, published elsewhere in this report.

#### GENERAL SEWERAGE.

I desire to repeat and emphasize the recommendations made in former reports of the necessity of an adequate sewer system for Baltimore. That the need of such a system has not been more apparent in the past is very largely due to the topography of our city. Built on rolling land, storm water is easily carried off, and it carries with it a large amount of filth that otherwise would accumulate in the gutters. This storm water, however, acts only on the surface, and can have no effect on



the soil which has become impregnated with organic matter from the 90,000 or more earth closets with which Baltimore is cursed. While it is true that the streets are, in a measure, cleaned by every heavy fall of rain, it by no means takes away from the city the overflow from earth closets and other unhealthy matter. Nearly all of our principal sewers, as well as the surface flow, empty into the harbor, which serves as a reservoir to store up this matter, and whenever dredging is done, or vessels enter or leave the harbor, the solid matter is stirred up from the bottom, creating a stench that is well nigh unbearable. Another important point in considering the disposal of sewage matter is the liability of the transmission of disease by flies and mosquitoes. It is well known that flies swarm wherever there is refuse matter undergoing decomposition. The earth closets being in every case close to the dwelling-house, it is evident that there is great danger of poison being carried by flies. That mosquitoes breed wherever there is a collection of stagnant water is well demonstrated, and they are numerous near cess-pools. Scientific observers have conclusively shown that mosquitoes are active agents in the transmission of disease, and that if malaria is to be obliterated from large cities the mosquito must be prevented from breeding. As long as these cess-pools are permitted to exist it will be impossible to exterminate them.

During the year there were 220 deaths from typhoid fever, an increase of 79 over the preceding year. While it may be said that this is not a large number for a city the size of Baltimore, I believe that with a proper sewer system the death rate from this cause would be lessened considerably.

In this connection I desire to call attention to the importance of dredging Jones' Falls from its mouth to Hillen street. Flowing as it does through a thickly built up section of the city, the stream is little more than a sewer, discharging its contents into the harbor. There is but a slight flow of the tide, and the result is the accumulations of hundreds of tons of de-

composing refuse matter at the mouth of the stream. This is not only injurious to health, but in warm weather the odor arising from this mass is unendurable. Powerful disinfectants have been poured into the stream at Hillen street, only to afford temporary relief.

#### THE PREVENTION OF BREEDING OF MOSQUITOES.

As stated above, it is recognized that the mosquito is the most important agent by which malaria is transmitted. It has been shown that this is a matter no longer capable of dispute. Careful investigations have shown that drainage and the free use of petroleum will put a stop to the breeding of mosquitoes. This was conclusively demonstrated at Havana, where yellow fever was eradicated by the drainage of all ponds and pools of water, the removal of empty barrels, cans, bottles and other vessels that might contain stagnant water, and the liberal use of petroleum in cess-pools and other places where they would naturally breed. Good results have been obtained in New York and other cities by the same methods, and wherever attempted it was shown that the mosquito was either obliterated or so reduced in numbers as to justify the expenditure.

#### COW STABLES IN THE CITY.

I am gratified to be able to report the adoption by the Mayor and City Council of an ordinance to regulate the keeping of milch cows within the city limits. This ordinance, a copy of which is appended, was approved May 13, 1902, but did not become effective until July 1st succeeding. It was too late in the year to deduce any satisfactory conclusions as to its value in lessening the death rate in young children, but another year I believe will show a decided decrease in the number of deaths from diarrhoeal diseases. At the time of the adoption of the ordinance there were 394 cow stables

within the city limits, containing 1,984 cows. When the ordinance became operative 107 stables, containing 1,496 cows, were closed. The terms of the ordinance had little or no effect on the cow stables located in the annexed portions of the city where there is sufficient space for pasturage and exercise, but it has a salutary effect there, as well as elsewhere, in compelling dairymen to keep their stables clean, well ventilated and properly lighted. The principal effect of the ordinance and its value to consumers of milk was in the more congested sections of the city, where a large number of stables were closed that in the nature of things could only produce milk unfit for human consumption. These stables were located in small back yards. They were dark, badly ventilated, and in many cases filthy. There was no place for the cows to graze or obtain needed fresh air and exercise, and many of them were kept in filthy stalls until they went dry and were sold for beef. By the removal of stables of this description it is hoped that the children of the poor will be enabled to have a purer article of milk than they have had heretofore, with a consequent reduction in infant mortality. The following is the full text of the ordinance:

**AN ORDINANCE REGULATING THE KEEPING OF COWS IN THE CITY OF BALTIMORE, AND TO PROVIDE PENALTIES FOR THE VIOLATION OF THE SAME.**

**SECTION 1.** Be it ordained by the Mayor and City Council of Baltimore, That from and after July 1st, 1902, it shall not be lawful for any person or persons to keep or possess within the corporate limits of Baltimore City any cow or cows, either for the conduct of the dairy business or for his or her personal use, unless and except such cow or cows shall be stabled on, or located and kept in and upon ground of not less than one-quarter acre in area, all of said area not occupied by the stable to be accessible to said cows, and set apart for them for exercise and fresh air; and upon the further express condition precedent, that a permit shall have first been obtained from the Health Commissioner permitting such cow or cows to be located within the corporate limits of the City of Baltimore as by this ordinance prescribed, which permit must designate upon its face specifically the location for the keeping of such cow or cows. The violation

of any of the regulations and restrictions of this section shall subject the person or persons violating to a fine of not more than twenty dollars (\$20.00) or less than five dollars (\$5.00), and a further fine of one dollar (\$1.00) for each day that the violation is continued after notice is given to discontinue.

SEC. 2. Be it further ordained, That it shall be unlawful for any person or persons to keep more than eight cows on each such area of one-quarter acre of ground; any person or persons violating this section shall be subject to a penalty of not more than twenty dollars (\$20.00) or less than five dollars (\$5.00), and one dollar (\$1.00) per day additional for each day that the offense is continued after notice is given to discontinue said violation, and such permits to be revocable by the Health Commissioner whenever said cow stables are not kept in good hygienic and sanitary condition.

SEC. 3. And be it further ordained, That wherever under this ordinance cows may be kept, pasturage must be provided for them. Any person or persons violating this section shall be subject to a penalty of not more than twenty dollars (\$20.00) or less than five dollars (\$5.00), and one dollar (\$1.00) per day additional for each day that the offense is continued after notice is given to discontinue said violation.

SEC. 4. And be it further ordained, That the owners of cows that may be kept within the city limits under this ordinance, shall register with the Health Department the place where said cows are kept; and the Health Department shall keep a complete register thereof. Failure on the part of the owners or possessors to register the place of their keeping shall subject such persons to a penalty of not more than twenty dollars (\$20.00) or less than five dollars (\$5.00).

SEC. 5. And be it further ordained, That the fines, forfeitures and penalties prescribed in this ordinance shall be collected as all other fines, forfeitures and penalties are now collected.

SEC. 6. The Health Commissioner shall, however, issue annual permits to persons desiring to keep not more than four cows on unimproved lots of less than one-fourth acre, but not less than one-eighth acre in area, providing said stable or stables have floors of cement or other non-absorbent material, and have windows on at least two sides, giving three square feet of window space for each animal, and stables to have air space in that part occupied by the animals of one and a half cubic foot for every pound live weight of the animals kept therein. And provided further, that said stables have all other necessary equipment and appliances for securing absolutely perfect and sanitary hygienic condition.

SEC. 7. And be it further ordained, That that part of Section First regulating the size of the lot on which cows may be kept within the corporate limits of the City of Baltimore, shall not apply to stables in which cows

are temporarily kept for sale or exchange only, provided said stables have floors of cement or other non-absorbent material, and have windows on at least two sides giving three square feet of window space for each animal, and stables to have air space in that part occupied by the animals of one and a half cubic feet for every pound live weight of the animals kept therein. And provided further, that said stables have all other necessary equipment and appliances for securing absolutely perfect and sanitary hygienic condition.

SEC. 8. Nothing in this ordinance shall be construed as repealing any ordinances, rules and regulations now existing for compelling perfect hygienic and sanitary condition of all cow stables within the corporate limits of the City of Baltimore.

Approved May 13, 1902.

THOMAS G. HAYES, *Mayor*.

*A True Copy, May 14, 1902.*

GEORGE N. NUMSEN, *Register*.

#### HOSPITAL FOR MINOR INFECTIOUS DISEASES.

It is a matter of regret that but little progress was made during the year toward the establishment of a hospital for minor infectious diseases, viz: scarlet fever, diphtheria and measles. The Mayor and City Council had appropriated \$25,000, and directed the sale of the Old Quarantine grounds and the Eastern Potters Field, the proceeds on which to be devoted to the purchase of a site and the construction of a hospital. A commission consisting of his Honor the Mayor, William H. Welch, M. D., I. E. Atkinson, M. D., John W. Chambers, M. D., John D. Blake, M. D., James Bosley, M. D., and Mr. F. X. Donnelly, was created to purchase a site and construct a hospital. After carefully examining several tracts of land the commission decided to purchase a lot of ten acres of ground situated on the Reisterstown turnpike, known as the Three Mile House. Unfortunately persons residing in the neighborhood objected to the establishment of such a hospital on the site selected, and by legislation had at Annapolis effectually prevented the construction of an infectious disease

hospital inside the city limits without the consent of the Mayor and City Council. The site was therefore abandoned and nothing further was accomplished. Later in the year a tract of 147 acres of land adjoining Bay View Asylum was acquired by the city for the use of that institution, with the understanding that about forty acres of the tract will be set aside, upon which to construct a hospital for the care of persons suffering with the minor infectious diseases. There is a mistaken impression in the minds of many persons that the hospital is to be used for the care of persons suffering with smallpox. There is no occasion for uneasiness on this score, as all cases of smallpox are treated at Quarantine, where ample facilities have been prepared.

#### REPAVING AND REPAIRING ALLEYS.

The condition of many of the alleys with which Baltimore is abundantly supplied is often a menace to the health of the city. The cobblestones used for paving these alleys soon become displaced by heavy wagons and carts, and the alleys are filled with ruts and holes which form receptacles for decomposing filth. With improved pavements the alleys could be kept comparatively clean with little effort. Great difficulty has been experienced in requiring property owners to regrade and repave alleys when directed to do so by the Health Department, and in several instances the aid of the courts had to be invoked to enforce a compliance with the law. It was found that in most cases where regrading and repaving were necessary, the abutting property owners preferred that the work be done under the supervision of the City Engineer, the cost to be assessed against the owners. There was not sufficient legal authority for this method, and for that and other reasons a bill was introduced in the last General Assembly authorizing the Commissioner of Health, whenever necessary, to have such regrading and repaving done by the City Engineer at the expense of the abutting owners. The bill was reported favorably by committee, but failed of passage.

## INSPECTION OF FOOD.

Careful attention was given to the character and quality of food offered for sale in the markets and stores. Two inspectors devoted their entire time to an examination of the milk supply, inspecting it first at the railway stations where it was received from the shippers, and later at dairies and stores and in the distributing wagons. During the year 33,503 lots of milk, containing 1,770,299 gallons, were examined, and 557 lots, containing 2,944 gallons, were condemned and spilled. One inspector was constantly engaged at the abbatoirs and slaughter-houses, who condemned a large number of cows and steers, suffering with lump jaw and tuberculosis. Another inspector made daily visits to the markets, stores and cold-storage houses, resulting in the condemnation of thousands of pounds of poultry, fish, crabs, vegetables, fruits, etc. Still another inspector made daily visits to the wharves to inspect food products coming into the city by water. The condemnation in 1901 of tons of sophisticated sausage sent here by western packers was a sufficient warning that such products could not be sold in Baltimore, and served to keep that character of food away from the city. For a detailed statement of the work in this line reference is made to the reports of the Bacteriological and Chemical Laboratories.

## INSPECTIONS OF PLUMBING AND DRAINAGE.

The work of the Division of Plumbing and Drainage was kept up to the high standard it attained when the force of inspectors was increased. Many unsanitary conditions were brought to light and corrected.

## DISINFECTION AND FUMIGATION.

Valuable service was rendered the city by the fumigation of houses infected with contagious diseases. The aim of the department is to fumigate premises as soon as possible, and so

effectually that all disease germs will be destroyed. Particular attention was given to the fumigation of houses infected with tuberculosis, and the department will take pleasure in fumigating such houses upon the request of physicians. During the year seventeen barrels, the equivalent of 85,000 gallons, of disinfectants were distributed.

#### QUARANTINE STATION.

I desire to call attention to the report of Dr. Sydney O. Heiskell, Assistant Commissioner of Health at Quarantine, accompanying this report. By careful and economical management Dr. Heiskell, while performing his manifold duties in a most conscientious manner, has so reduced the expenses of the station that the cost was but little in excess of the revenue derived from the inspection of vessels entering the port. I heartily concur in the recommendation of Dr. Heiskell for the construction of a barracks at the Quarantine Station for the detention of suspects.

Respectfully submitted.

JAMES BOSLEY, M. D.,  
*Commissioner of Health.*





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# REPORT REGISTRAR OF VITAL STATISTICS.

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# REPORT.

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JANUARY 1, 1903.

JAMES BOSLEY, M. D.,  
*Commissioner of Health.*

DEAR SIR:

I have the honor to submit my report of the Registrar of Vital Statistics for the year ended December 31, 1902.

In summing up the work of this division I desire to direct your attention to the accumulated mass of matter to be recorded when I was placed in charge in February, 1900. The division was created in 1875.

*The Record of Deaths.*—The certificates of death were recorded to date, but the indexes to the same ceased August 31, 1893.

*The Record of Births.*—The returns of births were recorded up to November, 1899, but the indexes ceased in August, 1881.

You will see that there were nearly seven years of death records that had not been indexed, aggregating 72,475 names. The indexes to the returns of births had not been given attention for nearly 19 years, aggregating 142,500 names, while the returns of births had not received attention from November, 1899, to February, 1900, numbering about 2,500 returns. In addition, I found several hundred returns of births filed among the recorded papers that had not been recorded, and several hundred names indexed under the wrong initial.

From the creation of this division until February, 1900, the work was performed by three officers—a Registrar's Clerk, whose duty was to register certificates of death, issue transcripts of the records, furnish the Supervisors of Elections with monthly lists of dead adults, and attend to the wants of the public having business with the division; a Recorder of Births and an Index Clerk.

From February, 1900, to January 1, 1902, all of this work devolved upon one man. During that period the recording of certificates of death was kept up to date, numerous letters of inquiry from out of town persons replied to, many errors that had accumulated from the inception of the division corrected, considerable indexing was accomplished, and all papers filed for safe keeping.

In the latter part of 1900 it became apparent that some radical change was necessary, due to the time lost in searching records that had not been indexed, and acting upon the suggestion of the Secretary of the Department, the recording of deaths was temporarily abandoned, and the time required for that work devoted to indexing the current certificates and much of the accumulated indexing. In March, 1901, a new system of indexing was adopted, which greatly facilitates the examination of the records.

In 1902 there were indexed, folioed and filed 10,253 certificates of death, while the returns of births were numbered and filed. Four hundred and thirty transcripts from the record of deaths and 6 transcripts from the record of births were issued. The Board of Election Supervisors were furnished monthly lists of deceased voters, in order that their names might be stricken from the registration lists. In addition to this it was necessary to handle a list of 570 names of persons, said to have died in Baltimore, that was submitted by the United States Census Office, with the claim that they did not appear upon our records. About one-half of these names were looked up, and it was found that the apparent discrepancy was due to

the deaths of residents of Baltimore in other cities, and a difference in the spelling of names. At intervals in the above work about 6,000 returns of births were indexed, but not recorded.

In January, 1902, an additional recorder was appointed (Mr. C. A. Wall, Jr.), who indexed 72,450 names, bringing the indexes to the record of deaths up to date, and recorded 4,500 certificates of death, covering the period from March, 1901, to August, 1901.

At present there are to be recorded 14,211 certificates of death, from August, 1901, to December 31, 1902, (these have been indexed), about 16,000 certificates of birth, covering the period from November, 1899, to December 31, 1902, and the indexing of the same, and the indexing of the returns of births from 1883 to 1899, making a total of about 152,000 returns of births to be indexed.

In conclusion I beg to call your attention to the importance of these records, which are constantly being referred to by lawyers and others to establish proof of deaths or births. For that reason they should speedily be brought up to date, and I respectfully recommend the appointment of at least one more recorder, and suggest that some means be adopted to enforce the law providing for the prompt return of births by physicians and midwives.

Respectfully submitted.

JOHN H. UHLENBERG,  
*Registrar's Clerk.*



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# TABLES.

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# VITAL STATISTICS OF THE CITY OF BALTIMORE FOR THE YEAR ENDING DECEMBER 31, 1902.

Estimated population, white.....	445,000
"        "        colored.....	80,000
<b>Total .....</b>	<b>525,000</b>
<b>Marriages reported.....</b>	<b>5,133</b>
<b>Rate per 1,000 population .....</b>	<b>9.78</b>
<b>Births reported, white males.....</b>	<b>3,653</b>
"        "        white females.....	3,540
	<hr/> 7,193
"        colored males.....	874
"        colored females.....	888
	<hr/> 1,757
<b>Total births reported.....</b>	<b>8,950</b>
<b>Birth rate per 1,000 population, whole .....</b>	<b>17.05</b>
"        "        "        white.....	16.17
"        "        "        colored.....	21.96
<b>Still births .....</b>	<b>659</b>
<b>Total mortality, white males .....</b>	<b>4,072</b>
"        "        white females.....	3,661
	<hr/> 7,733
"        colored males.....	1,274
"        colored females.....	1,246
	<hr/> 2,520
<b>Total deaths reported.....</b>	<b>10,253</b>
<b>Annual death rate per 1,000 population, whole .....</b>	<b>19.53</b>
"        "        "        "        less non-residents.....	18.70
"        "        "        "        white.....	16.16
"        "        "        "        less non-residents.....	15.32
"        "        "        "        colored.....	31.50
"        "        "        "        less non-residents.....	30.76

# HEALTH DEPARTMENT.

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Total number of deaths from measles.....	41
“ “ “ scarlet fever.....	37
“ “ “ diphtheria and croup.....	130
“ “ “ whooping cough.....	95
“ “ “ typhoid fever.....	220
“ “ “ diarrhœa and enteritis.....	82
“ “ “ dysentery.....	78
“ “ “ infantile diarrhœa and cholera in- fantum.....	695
“ “ “ tuberculosis of the lungs.....	1,159
“ “ “ pneumonia.....	1,010
“ “ “ bronchitis.....	241
“ “ “ influenza.....	28
“ “ “ Bright's disease.....	659
“ “ “ cancer.....	384
“ “ “ diseases of the heart.....	716
“ “ “ sunstroke and heat exhaustion....	9
“ “ “ anaemia.....	25
“ “ “ accidents.....	416
“ “ “ puerperal fever.....	62
“ “ “ “ convulsions.....	18
“ “ “ “ hemorrhage. . . . .	13
Total mortality under five years of age.....	3,827
“ from diarrhœal diseases, under five years of age..	695
“ “ “ all ages.....	855

## DEATHS IN PUBLIC INSTITUTIONS.

Baltimore City Jail.....	9
Penitentiary.....	20
Hospitals and asylums.....	1,856
Total.....	1,885
Number of coroners' inquests.....	1,072
“ autopsies.....	83
“ non-residents dying in the city, white.....	376
“ “ “ “ colored .. . . .	59

TABLE No. I.  
Showing the Number of Infectious and Contagious Diseases Reported During the Year 1902.

Diseases.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Smallpox.....	.....	14	3	3	5	.....	1	.....	2	.....	.....	1	29
Diphtheria.....	86	80	88	61	40	26	39	59	77	143	125	117	941
Pseudo-membranous croup.....	5	.....	.....	1	2	.....	.....	.....	1	6	8	8	31
Scarlet fever.....	28	45	36	32	49	45	40	29	49	56	45	27	481
Typhoid fever.....	29	17	20	30	33	40	61	206	817	216	69	48	1,086
Measles.....	20	30	29	51	62	104	86	29	23	100	416	959	1,909
Mumps.....	7	8	10	3	5	3	4	5	4	5	2	15	71
Whooping cough.....	35	14	37	63	41	58	39	44	18	12	18	16	385
Varicella.....	39	28	30	29	27	11	2	8	4	2	17	39	231
Tuberculosis pulmonalis	27	24	36	35	34	19	25	19	37	35	36	29	356
Total.....	276	260	289	308	298	306	297	394	532	575	736	1,259	5,530

TABLE No. II.  
Showing the Number of Deaths according to Ages During the year 1902.

Ages.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Under 1 year.....	156	151	168	144	156	254	407	317	233	171	123	169	2,449
Between 1 and 2 years..	37	44	28	38	82	41	59	45	39	24	35	49	468
" 2 and 5 " ..	41	29	40	30	28	34	40	24	24	28	47	47	412
Total under 5 years.	234	224	236	207	216	329	506	386	296	223	205	265	3,327
Between 5 and 10 years	17	11	24	17	25	24	17	19	15	15	23	26	233
" 10 and 15 "	11	9	12	11	13	17	18	20	13	10	16	18	168
" 15 and 20 "	19	14	23	25	19	23	29	31	30	20	29	23	285
" 20 and 30 "	87	66	84	91	79	81	69	78	89	71	59	68	922
" 30 and 40 "	87	87	74	73	71	81	65	69	71	81	63	72	894
" 40 and 50 "	96	76	95	71	93	74	80	84	71	75	71	96	982
" 50 and 60 "	107	85	98	103	87	68	75	54	79	65	69	110	1,000
" 60 and 70 "	114	115	96	100	99	79	82	74	78	85	92	113	1,127
" 70 and 80 "	94	85	70	78	66	65	78	69	52	61	60	97	875
" 80 and 90 "	38	31	32	46	30	30	28	29	15	32	82	36	379
" 90 and 100 "	8	12	5	7	5	3	4	2	2	4	1	8	56
" 100 and 110 "		1					1		1			1	4
Unknown .....					1								1
Total.....	912	816	849	829	804	874	1,052	915	812	742	720	928	10,253















TABLE No. V.

Showing the Nativity of the Decedents for the year 1902.

Nativity.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
United States—White males	273	234	232	233	230	257	364	297	259	238	224	204	3,135
"    White females	252	229	245	210	211	243	307	285	227	196	202	223	2,830
Foreign—White males....	83	79	72	97	86	64	72	67	53	65	83	95	916
"    females....	80	73	72	70	61	65	74	68	60	64	58	83	828
Colored males.....	109	105	113	102	109	120	124	88	112	93	76	108	1,259
"    females.....	110	94	109	112	101	120	110	108	95	84	76	118	1,237
Unknown white males....	1	2	3	4	1	2	.....	2	2	1	.....	3	21
"    females....	.....	.....	1	.....	.....	.....	.....	.....	2	.....	.....	.....	3
"    colored males....	3	.....	1	1	3	2	.....	.....	2	1	1	1	15
"    females....	1	.....	1	.....	2	1	1	.....	.....	.....	.....	3	9
Total.....	912	816	849	829	804	874	1,052	915	812	742	720	928	10,253

Showing the Number of Marriages During the Year 1902.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Marriages.....	331	356	328	494	293	601	327	328	478	560	546	451	5,133

TABLE No. VI.  
Showing the Number of Births Reported During the Year 1902.

Color and Sex.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
White males.....	330	279	297	272	262	242	291	362	344	323	346	305	3,653
" females.....	308	295	292	269	254	247	315	304	315	288	347	306	3,540
Colored males.....	55	75	79	86	59	48	108	73	81	69	64	77	874
" females.....	84	79	70	73	53	54	83	57	88	61	97	84	883
Total.....	777	728	738	700	628	591	797	796	828	741	854	772	8,950
ILLEGITIMATES.													
White males.....	10	15	4	4	13	16	15	12	19	19	19	14	160
" females.....	11	8	12	15	15	18	13	10	14	16	18	16	166
Colored males.....	16	15	21	21	19	13	25	7	17	24	23	27	228
" females.....	20	20	10	27	12	19	18	5	26	21	26	21	221
Total.....	57	58	47	67	59	66	71	34	76	80	86	78	779
STILL BIRTHS.													
White males.....	21	29	15	21	27	21	31	20	22	27	13	15	262
" females.....	16	11	12	23	22	15	18	10	15	20	8	18	188
Colored males.....	10	12	3	7	16	8	10	6	9	8	5	14	108
" females.....	12	12	11	3	9	7	7	8	8	6	7	11	101
Total.....	59	64	41	54	74	51	66	44	54	61	33	58	659

TABLE No. VII.

Showing the Number of Deaths Reported During the Year 1902 in Monthly Periods—Sex, Color and Nativity.

MONTHS.	NATIVE WHITE.			FOREIGN WHITE.			WHITE.			COLORED.			TOTALS.	
	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.	Total.	Males.	Fe- males.
January .....	273	252	525	83	80	163	U'n 1 356	332	689	U'n 3 109	U'n 1 110	223	469	443
February ...	234	229	463	79	78	152	U'n 2 313	302	617	U'n 1 105	U'n 1 94	199	420	396
March .....	232	245	477	72	72	144	U'n 3 304	317	625	U'n 1 113	U'n 1 109	224	421	428
April .....	233	210	443	97	70	167	U'n 4 330	280	614	U'n 1 102	U'n 1 112	215	437	392
May .....	230	211	441	86	61	147	U'n 1 316	272	589	U'n 3 109	U'n 2 101	215	429	375
June .....	257	243	500	64	65	129	U'n 2 321	308	631	U'n 2 120	U'n 1 120	248	445	429
July .....	364	307	671	72	74	146	436	381	817	124	U'n 1 110	235	560	492
August .....	297	285	582	67	68	135	U'n 2 364	353	719	88	108	196	454	461
September ...	259	227	486	53	60	113	U'n 2 312	287	603	U'n 2 112	95	209	428	384
October .....	238	196	434	65	64	129	U'n 1 303	280	564	U'n 1 93	84	178	398	344
November ...	224	202	426	83	58	141	307	260	567	U'n 1 76	78	153	384	336
December ...	294	223	517	95	83	178	389	306	698	U'n 1 108	U'n 3 118	280	501	427
Total .....	3,135	2,830	5,965	916	828	1,744	4,072	3,661	7,733	1,274	1,246	2,520	5,346	4,907
														10,253

## HEALTH DEPARTMENT.

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TABLE No. VIII.

Showing the Number of Deaths According to Wards During the Year 1902.

Wards.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
First.....	29	32	31	25	21	32	46	49	26	31	26	38	386
Second.....	33	35	34	28	38	36	53	46	31	42	31	41	448
Third.....	35	32	34	25	32	45	48	44	37	30	32	32	426
Fourth.....	61	55	61	62	68	88	63	41	49	43	50	61	652
Fifth.....	32	31	34	29	44	39	48	41	21	23	29	31	402
Sixth.....	35	34	22	27	33	27	40	46	41	31	38	45	419
Seventh.....	46	50	35	49	38	45	57	86	38	36	37	57	524
Eighth.....	32	21	33	28	23	28	42	34	38	25	30	33	367
Ninth.....	32	22	25	27	29	25	28	26	28	31	23	30	326
Tenth.....	37	32	30	26	42	48	56	87	32	29	33	38	440
Eleventh.....	45	37	44	37	22	34	43	24	28	40	28	38	400
Twelfth.....	34	32	34	34	35	33	38	35	33	27	27	42	404
Thirteenth.....	33	28	29	31	17	22	34	23	19	16	24	31	302
Fourteenth.....	63	53	53	50	59	58	53	59	50	60	33	47	638
Fifteenth.....	24	20	27	33	35	25	30	35	35	25	21	34	344
Sixteenth.....	42	42	27	31	30	26	38	27	26	28	22	42	376
Seventeenth.....	55	40	28	33	33	34	39	39	35	25	28	41	433
Eighteenth.....	46	34	46	43	30	29	33	33	30	33	30	37	436
Nineteenth.....	34	34	30	39	29	46	45	33	31	31	31	28	411
Twentieth.....	24	21	34	27	22	29	37	26	21	21	22	24	308
Twenty-first.....	25	32	80	28	25	40	49	43	31	23	28	33	382
Twenty-second.....	42	30	37	45	37	27	45	36	33	31	33	33	429
Twenty-third.....	36	16	34	21	22	39	38	25	36	14	29	22	332
Twenty-fourth.....	32	25	24	22	22	39	30	41	28	30	17	38	348
Bay View Asylum.....	25	33	83	34	18	30	19	29	27	22	18	32	320
Total.....	912	816	849	829	804	874	1,052	915	812	742	720	928	10,253

TABLE No. IX.  
Showing the Number of Deaths in Hospitals, Public Institutions, Inquests, etc., for the Year 1902.

Hospitals, Institutions, Etc.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Hospitals—Resident, white.....	64	60	56	64	55	49	47	64	53	58	45	55	660
" " " colored.....	22	9	29	15	29	21	18	13	23	26	16	28	249
" " Non-resident, white.....	19	23	25	23	30	25	85	21	25	28	33	34	321
" " " colored.....	1	3	5	7	8	5	4	7	11	1	2	3	52
Other Institutions, Asylums, etc.													
Resident, white.....	28	34	17	34	39	41	44	43	30	39	33	29	411
" " colored.....	7	9	9	12	15	4	11	5	13	4	2	10	101
Non-resident, white.....	6	2	1	3	5	7	6	7	4	4	6	4	55
" " colored.....	1	1	1	1	1	2	1	1	2	2	1	1	7
Jail.....	1	1	1	1	1	1	1	1	1	1	1	1	9
Penitentiary.....	1	1	1	2	2	4	4	1	2	3	1	1	20
Total.....	149	141	142	151	178	159	170	161	164	167	138	165	1,885
Coroners' inquests.....	102	84	97	101	85	95	107	94	61	85	77	84	1,072
Autopsies.....	8	6	8	10	11	8	7	6	4	6	5	4	83





## REPORT OF THE HEALTH DEPARTMENT.

Total.	
680	
249	
321	
52	
411	
101	
55	
7	
9	
20	
1,885	
3,072	
83	

Showing t	
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Other Institutions,	
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" " color	
Non-resident,	
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Jail.....	
Penitentiary . . . .	
Total.....	
Coroners' inquests	
Autopsies.....	

.....

## REPORT OF THE HEALTH DEPARTMENT.

Showing to	
Hospitals, Institutions	
Hospitals—Resident	
“ “	
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Other Institutions, As	
Resident, white	
“ “ colore	
Non-resident, w	
“ “	
Jail.....	
Penitentiary.....	
Total.....	
Coroners' inquests.	
Autopsies.....	

Total.	660	411	1,885
	249	101	1,072
	321	55	83
	52	7	
		9	
		20	







TABLE No. XIII.

Showing the Number of Deaths from all Causes During the Year 1902.

DISEASES.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
<i>I.—General Diseases.</i>													
Typhoid fever.....	10	8	5	13	12	13	19	38	43	29	23	7	220
Intermittent fever and malarial cachexia.....	2	1	2	2	2	3	2	6	9	.....	.....	2	31
Smallpox.....	.....	.....	3	2	.....	1	.....	.....	1	.....	.....	.....	7
Measles.....	.....	.....	1	3	2	6	8	3	1	4	4	13	41
Scarlet fever.....	3	5	1	.....	5	4	5	3	2	2	6	1	37
Whooping cough.....	4	2	9	.....	10	16	13	14	4	5	3	4	95
Diphtheria.....	14	3	5	4	8	5	1	9	10	9	14	17	99
Pseudo-membranous croup.....	.....	.....	1	3	2	.....	1	1	.....	4	5	6	22
Croup.....	1	.....	.....	1	.....	.....	1	2	.....	2	2	.....	9
Influenza (la grippe).....	10	3	4	3	3	.....	1	1	.....	2	2	2	28
Cholera nostras.....	.....	.....	1	1	2	6	6	.....	.....	.....	.....	1	16
Dysentery.....	1	2	.....	4	2	11	23	19	3	6	3	4	78
Erysipelas.....	4	5	2	5	.....	.....	3	.....	1	1	1	.....	21
Mumps.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	1
Purulent infection and septicæmia.....	4	3	11	4	5	2	5	3	2	2	2	4	47
Malignant pustule and charbon.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Rabies.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Actinomycosis.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1
Tubercle of the larynx.....	1	1	.....	8	2	13	.....	.....	.....	1	.....	.....	1
" " lungs.....	101	72	100	114	117	100	72	90	103	92	99	96	1,159
" " meninges.....	4	3	8	6	8	3	6	1	3	4	4	6	56
" " abdominal.....	1	1	3	2	3	1	1	3	3	3	.....	2	23
White swelling.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	2

Tubercle of other organs.....	1	2	3	1	2	1	1	6	1	1	1	1	1	20
Generalized tubercle.....	3					2	1	2	1	1	1	1	1	10
Scrofula.....						1								1
Syphilis.....	6	3	1	2	2	2	1	5		1		2	1	24
Cancer and other malignant tumors—														
Of the buccal cavity.....	3	2	2	2	1	3	1	1		1		1	2	18
" stomach and liver.....	10	16	16	7	12	10	13	15	10	12		7	17	145
" peritoneum, intestines or rectum.....	1	4	1	3	3	4	4	2	4	4	5	3		38
" female genital organs.....	3	11	9	3	8	7	6	1	7	6	6	4		71
" breast.....	6	5	6	1	5	3	5	4	4	2	1	2		43
" skin.....				1	1	1	1	3	1	1	1			8
" other organs and organs not specified.....	7	2	8	10	4	3	3	5	3	6	6	4		61
Other tumors, female genitals excepted.....	2	2		2	2		3	4	5		4			24
Rheumatism—acute, articular.....	5	3	9	1	3	1	3	3	1	1	4	2		36
Rheumatism—Chronic and gout.....	5	2	2	2	1		2		1		3	1		17
Scorbutus.....	1		1											2
Diabetes.....	5	4	3	6	4	4	1	3	6	2	3	5		46
Exophthalmic goitre.....				1	1		1				1			4
Addison's disease.....				1										1
Leukaemia.....		1		1			1							5
Anaemia and chlorosis.....	2	1	2	3	1	5	2	4		2	2	1		25
Acromegaly.....								1						1
Alcoholism—Acute and chronic.....	1	4	4	4	6	5	1	7	5	3	2	4		46
Lead poisoning.....			1						1					2
Other professional intoxications.....					1									1
<i>2.—Diseases of the Nervous System and Organs of Special Sense.</i>														
Encephalitis.....	1	1												2
Meningitis—simple.....	5	10	8	5	9	10	14	5	7	6	9	7		95
" cerebro-spinal.....	2	4		2	3	7	2	1	3	1	3	1		29
" cerebral.....	4	4	2	3		4		1	3		3			24
" spinal.....	1	2	1		1	2	1	1	1	1		1		12

*2.—Diseases of the Nervous System and Organs of Special Sense.*

Encephalitis.....	1	1												2
Meningitis—simple.....	5	10	8	5	9	10	14	5	7	6	9	7		95
" cerebro-spinal.....	2	4		2	3	7	2	1	3	1	3	1		29
" cerebral.....	4	4	2	3		4		1	3		3			24
" spinal.....	1	2	1		1	2	1	1	1	1		1		12



TABLE No. XIII—Continued.

DISEASES.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	TOTAL.
<i>2.—Diseases of the Nervous System and Organs of Special Sense—Continued.</i>													
Progressive locomotor ataxia .....	1	2	4	1	3	2	1	1	1	1	1	3	9
Other diseases of the spinal cord .....	39	28	17	21	28	36	23	26	28	89	29	32	31
Congestion and hemorrhage of the brain .....	2	1	4	5	3	2	7	7	7	2	1	4	40
Cerebral softening .....	20	20	14	14	17	9	13	8	10	10	11	16	162
Paralysis without specific cause .....		2	1	1	2	1	2	1	2	2		1	12
General paralysis .....	1		1	1					2			1	6
Other forms of insanity .....	4	2	3	3	2	1	1	1			2	1	20
Epilepsy .....		1	1	1	1								4
Convulsions, not puerperal .....	10	22	16	13	9	16	21	13	8	15	11	12	166
Convulsions of infants .....	2	2	2		3	5	1	4	2	1		4	26
Tetanus .....							1	1					1
Chorea .....	5	6	5	6	2	4	4	1	6	5	5	3	52
Other nervous diseases .....	1		2	1	1			1	1				7
Diseases of the ear and its adnexa .....													
<i>3.—Diseases of the Circulatory System.</i>													
Pericarditis .....		1	1		1			2				1	5
Endocarditis .....	4	6	2	5	6	2	3	2	1	2	6	5	44
Organic heart diseases .....	51	52	69	59	54	43	36	46	49	50	53	72	634
Angina pectoris .....	6	5	2	3	2	2	3		2	4		5	33
Affections of the arteries—atheroma, aneurism, etc.	19	7	16	9	12	10	7	4	8	7	7	6	112
Embolus and thrombosis .....		1		1							1	2	5
Affections of the veins, varices, hemorrhoids, phlebitis .....	1	1					1				1	1	4
Affections of lymphatic system, lymphangitis, etc.	1	2								1			4

4.—*Diseases of the Respiratory System.*

Affections of the larynx.....	1	1	2	1	9	11	3	2	6	10	9	2	7
Acute bronchitis.....	17	16	26	15	9	8	5	7	4	2	13	24	148
Chronic bronchitis.....	16	3	9	6	9	8	5	7	4	2	13	11	93
Broncho-pneumonia.....	25	32	23	25	12	12	3	4	6	9	11	37	199
Pneumonia.....	126	117	85	82	70	30	36	19	34	48	46	118	811
Pleurisy.....	6	2	3	3	4	1	3	2	1	...	...	3	28
Congestion of the lungs.....	2	3	7	1	5	2	...	1	2	1	3	5	32
Gangrene of the lungs.....	...	1	...	...	...	...	...	...	...	...	...	...	3
Asthma.....	3	2	2	4	5	2	1	2	2	1	3	2	29
Pulmonary emphysema.....	1	2	...	...	1	...	...	1	...	1	...	1	7
Other diseases of the respiratory system (phthisis excepted).....	2	1	3	3	5	...	1	1	4	3	7	7	37

5.—*Diseases of the Digestive Apparatus.*

Affections of the mouth and its adnexa.....	1	1	...	2	...	...	...	...	...	...	1	1	6
“ “ pharynx.....	2	1	1	...	...	...	...	...	...	1	2	...	3
“ “ oesophagus.....	...	...	2	2	1	1	1	2	2	8	...	1	4
Ulcer of the stomach.....	2	2	2	...	...	13	9	13	20	4	9	17	22
Other affections of the stomach, cancer excepted...	18	12	14	18	18	13	9	13	20	4	9	17	165
Diarrhoea and enteritis, under five years of age.....	4	8	5	13	16	112	261	158	73	24	11	10	695
“ “ above five years of age.....	4	1	6	6	8	5	18	18	6	2	6	2	82
Hernia and intestinal obstruction.....	12	3	7	7	3	10	6	5	8	9	5	12	87
Other affections of the intestines.....	2	2	5	2	8	...	2	3	1	3	2	3	28
Icterus gravis.....	...	1	1	8	...	...	...	...	1	1	...	...	7
Cirrhosis of the liver.....	6	8	6	3	9	9	9	6	8	3	3	2	72
Biliary calculi.....	2	...	2	2	...	3	...	1	...	...	2	12	12
Other affections of the liver.....	4	5	2	4	3	3	5	2	6	4	2	1	41
Affections of the spleen.....	...	...	...	...	...	...	...	...	...	...	...	1	1
Peritonitis, not puerperal.....	5	3	...	1	1	3	2	2	4	1	4	5	31
Other affections of the digestive apparatus, cancer and tubercle excepted.....	...	1	...	...	...	...	...	...	...	...	...	...	1
Appendicitis and abscess of the iliac fossa.....	6	6	6	4	7	9	5	6	6	...	5	6	66

TABLE No. XIII—Continued.

DISEASES.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
<i>6.—Diseases of the Genito-Urinary Apparatus and its Adnexa.</i>													
Acute nephritis.....	3	3	7	2	1	2	3	3	6	4	3	2	36
Bright's disease.....	69	57	48	56	57	57	64	47	47	30	52	82	659
Other diseases of the kidneys and their adnexa...	1	2	...	2	1	1	...	1	1	2	2	2	14
Calculi of the urinary tract.....	1	1	...	...	1	...	...	...	1	...	...	...	5
Diseases of the bladder.....	4	4	2	3	1	1	4	2	2	3	1	1	26
Diseases of the urethra, urinary abscess.....	1	1	2	...	1	1	...	1	1	1	1	1	8
Diseases of the prostate.....	1	1	2	1	1	1	...	1	1	1	2	3	11
Non-venereal diseases of the male genital organs.....	1	1	1	...	...	...	...	...	...	...	...	...	1
Metritis.....	1	1	...	1	...	...	...	...	...	1	1	1	8
Uterine hemorrhage, non-puerperal.....	1	1	1	1	...	...	...	...	1	...	...	...	2
Uterine tumor, non-cancerous.....	1	3	2	2	2	2	2	3	1	...	2	2	19
Other diseases of the uterus.....	1	1	1	...	...	...	...	...	...	1	1	1	4
Cysts and other tumors of the ovary.....	1	1	3	3	1	1	...	...	...	...	...	1	5
Other diseases of the female genital organs.....	1	1	4	2	2	2	1	3	2	...	1	1	17
<i>7.—The Puerperal State.</i>													
Accidents of pregnancy.....	8	...	...	3	...	1	3	...	...	1	1	2	14
Puerperal hemorrhage.....	1	1	2	1	2	...	...	2	1	3	1	...	13
Other accidents of labor.....	...	...	3	2	...	...	2	3	...	...	...	...	10
Puerperal septicaemia.....	7	4	7	9	3	3	5	3	4	6	7	4	62
Puerperal albuminuria and eclampsia.....	...	2	...	...	5	...	2	3	1	1	...	1	18

8.—*Diseases of the Skin and Cellular Tissue.*

Gangrene.....	1	2	1	1	2	1	1	1	2	2	14
Furuncle (carbuncle).....	1	2	2	1	1	1	1	1	1	1	6
Phlegmon, warm abscess.....	1	1	2	3	4	1	1	1	1	1	13
Other diseases of the skin and its adnexa.....	1	1	1	1	1	1	1	1	2	2	8
<i>9.—Diseases of the Organs of Locomotion.</i>											
Affections of the bones.....	2	1	1	3	3	1	1	1	2	1	17
<i>10.—Malformations.</i>											
Malformations, congenital (still births excepted).....	1	1	2	5	2	6	2	2	2	4	30
<i>11.—Early Infancy.</i>											
Congenital icterus, debility and sclerema.....	29	18	21	17	27	29	32	22	37	30	316
Other diseases of early infancy.....	2	2	2	2	2	2	2	2	1	1	8
Lack of care (inanition, malnutrition, etc.).....	41	43	51	38	46	60	91	102	87	65	695
<i>12.—Old Age.</i>											
Senile debility.....	30	35	26	37	18	27	21	26	14	26	315
<i>13.—Affections Produced by External Causes.</i>											
Suicide—By poison.....	1	1	1	3	2	4	2	2	2	2	21
“ “ asphyxia.....	2	2	1	1	1	1	1	1	1	1	6
“ “ hanging or strangulation.....	1	1	1	1	1	1	1	1	1	1	4
“ “ drowning.....	1	1	1	1	1	1	1	1	1	1	3
“ “ firearms.....	1	4	4	1	1	2	2	1	2	1	18
“ “ cutting instruments.....	1	1	1	1	1	1	1	1	1	1	5
“ “ precipitation from a height.....	1	1	1	1	1	1	1	1	1	1	3

TABLE No. XIII—Continued.

DISEASES.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
<i>18.—Affections Caused by External Causes—Continued.</i>													
Fractures of the femur.....	2	2	2	2	4	2	2	2	1	1	1	3	14
"    "    skull.....	4	1	3	3	1	2	3	3	1	1	2	1	22
"    "    vertebrae.....	1	1	1	2	3	2	2	3	1	1	1	1	1
"    "    other.....	1	1	2	3	1	2	2	3	1	1	1	1	13
Other accidental injuries—													
Dystocia.....	1	1	5	1	1	2	1	1	2	4	3	5	25
Electric shock.....	1	1	1	1	1	1	1	1	1	1	1	1	4
Falls.....	2	2	5	3	3	6	4	6	3	3	5	1	41
Gunshot.....	1	1	1	1	1	2	2	2	1	1	2	1	11
Railroad accidents and injuries.....	7	2	7	5	2	4	8	2	6	1	9	8	61
Vehicles and horses.....	2	1	1	1	1	1	1	1	1	2	1	1	9
"    by fire.....	6	6	5	3	5	8	3	3	6	6	11	11	73
"    by liquids (scalds).....	1	1	1	1	1	1	1	1	1	1	1	1	7
Sunstroke (insolation).....	1	1	1	1	1	1	1	1	1	1	1	1	9
Accidental drowning.....	1	1	2	5	8	11	14	4	3	2	1	2	56
Inanition.....	1	1	1	1	1	1	1	1	1	1	1	1	2
Absorption of deleterious gases (suicide excepted).....	5	1	4	1	1	1	1	1	1	2	2	6	22
Other acute poisonings.....	2	2	1	1	2	2	1	1	1	1	1	2	13
Other external violence—homicide.....	1	1	1	2	3	3	3	3	1	1	1	1	15
"    "    legal executions.....	1	1	1	1	1	1	1	1	1	1	1	1	1
"    "    other accidents.....	9	5	3	3	1	2	3	1	3	2	1	2	35

14.—*Causes Ill-Defined.*

Dropsy .....	1	1	1	3	1	5	2	14
Sudden death (not puerperal) .....	1	1	3	8	3	0	6	34
Unspecified or ill-defined .....	12	12	4	4	2	4	7	70
Total .....	912	816	849	829	804	874	1052	915
						812	742	720
							928	10253















TABLE No. XVI.

Showing the Number of Deaths Annually from Typhoid Fever During a Period of Thirteen Years from 1888 to 1902, Inclusive, Male and Female, White and Colored, in the City of Baltimore.

YEAR.	Estimated Population.	WHITE.			COLORED.			Total Males.	Total Females.	Total Deaths.
		Males.	Females.	Total.	Males.	Females.	Total.			
1888	395,899	88	90	178	80	14	94	168	104	272
1889	404,498	88	93	181	23	20	43	111	113	224
1890	413,671	135	109	244	26	31	57	161	140	301
1891	426,917	82	75	157	13	19	32	95	94	189
1892	440,163	90	102	192	19	15	34	109	117	226
1893	453,409	108	120	228	11	16	27	119	136	255
1894	466,665	103	104	207	23	27	50	126	131	257
1895	479,907	82	75	157	21	14	35	103	89	192
1896	493,147	93	81	174	16	14	30	109	95	204
1897	506,398	99	76	175	20	14	34	119	90	209
1898	541,000	96	62	158	18	24	43	115	86	201
1899	541,000	67	52	119	18	16	34	85	68	153
1900	541,000	83	69	152	21	16	37	104	85	189
1901	518,000	66	44	110	11	20	31	77	64	141
1902	525,000	99	73	172	24	24	48	123	97	220

TABLE No. XVII.  
Comparison of Deaths from All Causes, and from Specified and Contagious Diseases for Twenty-five Years,  
from 1877 to 1902, inclusive.

Years.	Population.	Measles.	Scarlet Fever.	Typhoid Fever.	Group.	Diphtheria and Pseudo-mem.	Whooping Cough.	Dysentery.	Cholera Infantum.	Children Under 5 Yrs.	Total Mortal- ity. All causes.
1877.....	311,275	161	597	235	157	455	297	52	616	4,584	7,910
1878.....	318,182	11	141	176	149	303	63	41	343	8,372	6,738
1879.....	325,139	43	367	166	186	298	80	60	475	3,385	7,618
1880.....	332,313	12	400	198	173	293	148	57	503	3,602	8,043
1881.....	338,649	162	215	197	242	639	93	56	558	8,919	8,116
1882.....	347,142	71	179	165	222	707	43	62	390	3,755	8,923
1883.....	354,832	130	334	126	201	591	59	52	473	4,062	9,380
1884.....	362,668	228	104	151	127	343	120	43	496	3,643	8,293
1885.....	370,696	16	68	155	148	252	63	60	498	8,228	8,158
1886.....	378,903	201	32	150	128	190	91	84	485	3,565	8,839
1887.....	387,340	85	36	156	153	149	98	137	567	3,477	8,372
1888.....	395,899	176	44	161	98	118	112	167	654	3,881	8,996
1889.....	404,498	11	71	191	53	155	54	156	572	3,505	8,703
1890.....	413,671	248	42	247	45	274	100	212	507	4,117	10,198
1891.....	426,917	16	128	150	44	350	103	118	531	3,910	10,073
1892.....	440,163	120	258	193	47	881	32	109	661	4,443	10,582
1893.....	453,409	39	36	224	25	185	60	62	444	3,604	9,554
1894.....	466,655	3	85	222	33	198	112	72	440	3,761	9,486
1895.....	479,907	68	59	173	45	265	68	70	510	4,026	10,301
1896.....	493,147	27	31	183	82	249	87	82	412	3,728	9,919
1897.....	506,398	16	53	189	13	347	42	57	401	3,510	9,329
1898.....	541,000	48	46	189	50	362	64	82	386	3,939	10,385
1899.....	541,000	5	24	153	.....	812	19	.....	.....	3,319	10,152
1900.....	541,000	24	20	189	12	267	47	77	848	3,695	10,700
1901.....	518,000	3	11	141	7	164	63	49	726	3,391	10,479
1902.....	525,000	41	37	220	9	121	95	78	695	3,327	10,253

## REPORT OF THE

TABLE No. XVIII.  
SALARIES—HEALTH DEPARTMENT, FOR YEAR 1902.

To appropriation.....	\$57,576 00	By voucher A.....	\$4,654 63
		" " B.....	4,819 63
		" " C.....	4,819 63
		" " D.....	4,780 92
		" " E.....	4,819 63
		" " F.....	4,819 63
		" " G.....	4,819 63
		" " H.....	4,819 63
		" " J.....	4,773 66
		" " K.....	4,774 63
		" " L.....	4,715 31
		" " M.....	4,819 63
		" unexpended balance.....	139 44
	<u>\$57,576 00</u>		<u>\$57,576 00</u>

TABLE No. XIX.

GENERAL HEALTH ACCOUNT FOR THE YEAR 1902—APPROPRIATION... \$12,599 00  
 FOR ACCOUNT OF SMALLPOX—APPROPRIATION... 5,730 00  
 Total... \$18,329 00

To 485 Warrants on Comptroller.....	\$18,329 00	
By antitoxine .....	\$1,429 79	
By fumigations.....	451 62	
By car fare.....	615 00	
By advertising .....	85 23	
By subscriptions to journals.....	69 83	
By coffins for pauper dead.....	123 05	
By rent 1330 Philpot street.....	156 00	
By publishing annual report.....	1,026 50	
By ice and incidentals for City Morgue .....	335 51	
By disinfectants .....	517 94	
By vaccine virus.....	898 00	
By digging graves.....	20 00	
By care of city patients.....	127 25	
By telephone rentals .....	346 29	
By postage.....	846 00	
By hire of horses and livery.....	1,820 70	
By bacteriological laboratory.....	915 21	
By chemical laboratory .....	553 99	
By sundry accounts.....	1,010 88	
By guarding infected houses.....	161 71	
By care of smallpox.....	6,828 37	
		\$18,329 00



TABLE No. XX.

Statement of Appropriations to, Expenditures by, and Unexpended Balances of the Sub-Department of Health, Department of Public Safety, for the Year Ended December 31, 1902.

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<i>Appropriations.</i>	
Salaries .....	\$57,576 00
General health.....	12,599 00
Emergency fund for care of smallpox.....	5,730 00
Salaries, Quarantine Station.....	11,065 00
General expense, Quarantine.....	6,960 00
Appropriation for artesian well.....	600 00
Total.....	<u>\$94,530 00</u>
<i>Expenditures.</i>	
Salaries .....	\$57,436 56
General health and emergency accounts.....	18,329 00
Salaries, Quarantine Station .....	11,082 50
General expense, Quarantine Station.....	7,560 00
Total.....	<u>\$94,358 06</u>
<i>Unexpended Balances.</i>	
Salaries .....	\$139 44
Salaries, Quarantine Station.....	32 50
Received for transcripts, births and deaths.....	215 50

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TABLE No. XXI.  
SALARIES QUARANTINE STATION, 1902.

To appropriation.....	\$11,065 00	
By voucher A.....		\$ 895 00
" " B.....		920 00
" " C.....		941 00
" " D.....		920 00
" " E.....		981 00
" " F.....		920 00
" " G.....		915 00
" " H.....		920 00
" " J.....		920 00
" " K.....		915 00
" " L.....		920 00
" " M.....		915 00
" unexpended balance.....		82 50
		<u>\$11,065 00</u>
	<u>\$11,065 00</u>	

## REPORT OF THE

TABLE No. XXII.

QUARANTINE STATION ACCOUNT FOR THE YEAR 1902 - APPROPRIATION \$7,560 00.

To 178 warrants on Comptroller.....	\$7,560 00	
By provisions.....	\$1,292 67	
By groceries.....	846 05	
By ice.....	117 95	
By coal for tugboat and household use.....	865 14	
By new flags.....	26 00	
By rebate of inspection overcharge.....	10 15	
By advertisements.....	92 95	
By subscriptions to newspapers.....	11 50	
By car fare.....	20 00	
By clothing for smallpox patients.....	50 27	
By sundry household supplies.....	436 04	
By artesian well.....	693 44	
By repairs to and supplies for tugboat.....	1,195 78	
By farm implements, seeds, etc.....	155 83	
By hire of tugboats.....	148 00	
By fumigations.....	118 55	
By horse feed.....	406 32	
By drugs.....	80 45	
By gasoline launch.....	1,042 96	
	<hr/>	
	\$7,560 00	

TABLE No. XXIII.

REPORT OF INSPECTIONS OF NUISANCES MADE AND ORDERED ABATED BY  
SANITARY INSPECTORS DURING 1902.

Number of alleys to be cleaned.....	708
“ alleys to be repaired.....	1,116
“ alleys to be paved.....	185
“ premises to be cleaned.....	262
“ vacant lots to be drained, filled and cleaned.....	172
“ manure pits to be constructed.....	106
“ manure pits to be reconstructed and repaired.....	44
“ manure pits to be cleaned.....	204
“ drain pipes to be reconstructed and repaired.....	126
“ drain pipes to be cleaned.....	46
“ drain pipes to be laid.....	56
“ defective plumbing ordered reconstructed and repaired.....	302
“ yards to be cleaned.....	2,404
“ yards to be drained.....	77
“ yards to be repaired.....	255
“ yards to be paved.....	80
“ privies inspected and ordered cleaned.....	29,909
“ privies to be reconstructed.....	271
“ to be ventilated.....	24
“ water closets to be repaired and ventilated.....	104
“ excavating apparatuses inspected.....	117
“ cellars to be drained and filled.....	909
“ cellars to be cleaned.....	1,280
“ slaughter houses inspected.....	8
“ stables to be reconstructed and cleaned.....	75
“ water pipes and hydrants to be repaired.....	466
“ gutters to be repaired.....	184
“ rainspouts to be reconstructed.....	81
“ grass and weeds to be removed from gutters.....	755
“ ice ponds examined and permits granted.....	5
“ tenements ordered cleaned and whitewashed.....	14
“ samples of water collected for analysis.....	38
“ causes of death examined.....	1
“ sweat shops examined.....	27
“ complaints examined and no nuisance found to exist..	353
“ miscellaneous and extra examinations made.....	25,582
“ premises disinfected.....	1
“ bacteriological cultures made.....	163
“ schools examined.....	69
“ legal proceedings instituted for failure to comply with notices.....	126

## TABLE No. XXIV.

## CONTAGIOUS DISEASES INSPECTED.

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Number of cases of diphtheria.....	864
“ “ “ scarlatina.....	455
“ “ “ membranous croup.....	39
“ “ “ whooping cough.....	320
“ “ “ mumps.....	57
“ “ “ chicken pox.....	217
“ “ “ typhoid fever.....	826
“ “ “ varioloid.....	2
“ “ “ smallpox.....	2
“ “ “ cerebro-spinal meningitis.....	1
“ “ “ measles.....	1,717
“ “ “ tuberculosis.....	1
“ “ “ vaccinations.....	46,412
“ “ “ visits to vaccinate.....	4,976
“ “ “ examinations of vaccinations.....	10,111
“ “ “ school certificates issued.....	11,342
“ “ “ police station calls.....	511
“ “ “ units of diphtheria antitoxine injected.....	214,000

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## TRANSCRIPTS FROM THE RECORDS OF BIRTHS AND DEATHS

FOR THE YEAR ENDING DECEMBER 31, 1902.

Purposes.	From the Records of Deaths.											
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Pension.....	8	12	9	16	9	14	28	10	14	10	16	25
Insurance.....	19	16	16	12	12	20	11	5	20	15	23	16
Proof of death.....	3	3	0	2	1	2	1	0	3	3	0	1
Legal.....	0	0	3	2	1	3	0	2	7	0	4	1
Foreign.....	6	2	4	4	1	0	0	1	1	1	0	2
Total.....	46	33	32	36	24	39	40	18	45	29	43	45
Total.....	430											

Purposes.	From the Records of Births.											
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Pension.....	0	2	0	1	0	0	0	0	0	0	0	0
Foreign.....	0	0	0	0	0	0	0	0	0	0	1	0
Legal.....	0	0	0	0	0	0	0	0	1	1	0	0
Total.....	0	2	0	1	0	0	0	0	1	1	1	0
Total.....	6											

Grand total of 436. Collections \$215 50.

Respectfully submitted.

JOHN H. UHLENBERG, Registrar's Clerk.



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**REPORT**  
— OF THE —  
**Bacteriologic Laboratory.**

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## **Pathology of Smallpox.**

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It is a curious fact that although smallpox is among one of the earliest diseases to have received an accurate description, yet its cause has but recently become known.

It is not mentioned in the Egyptian records, the books of the Old or New Testament, or in the old Greek or Roman writings.

Rhazes, in the ninth century, however, gives an account of the disease in his Arabic "Treatise on the Smallpox and Measles," translated from the Latin edition into English in 1756.

The work begins with these words, "In the name of God, the Compassionate, the Merciful."

Rhazes recognized its infectious nature, and described the premonitory symptoms, such as fever, nausea and pain in the back. He described the varieties of discrete and confluent smallpox, and gave a most elaborate series of remedies to be used in treating the disease.

### **PATHOLOGY.**

A number of interesting changes have been noted in the various tissues and viscera of smallpox cases, and these changes are widely distributed throughout the system.

The pustular eruption is frequently found on the surface of the mucous membrane of the respiratory tract, and these often coalesce as ulcers, or masses of fibrinous inflammation.

These pustules and ulcers are often seen in the bronchi of the third and fourth order, and are quite frequent at the bifurcation of the bronchi. Necrosis of the surface epithelial cells is also very frequent, and fibrinous and purulent inflammation is also often present.

The lung often contains areas of broncho-pneumonia, and the liver, the kidney and the heart muscles show cloudy swelling and fatty degeneration. The heart muscle also often exhibits fragmentation of the fibres. The acute, soft splenic tumor of infection is usually present.

An interesting set of changes has been described by Weigert,<sup>1</sup> consisting in areas of local necroses in the liver, spleen, kidney and lymph glands. These areas consist of degenerated masses of coagulative necrosis containing much nuclear detritus, and many degenerated cells without nuclei.

The lesions of the bone-marrow first described by Chiari,<sup>2</sup> and called "*osteomyelitis variolosa*," are said to occur in 72 per cent. of all cases. These small scattered nodules are about the size of a pea, and under the microscope they consist principally of epithelioid cells, which are probably produced from the normal marrow cells by proliferation. Leucocytes and traces of fibrin are also present, and the masses often undergo coagulative necrosis.

Chiari examined the bone-marrow of 22 cases of smallpox in various stages with the following results: During the stage of simple early eruption, he investigated five cases, and found microscopic changes in three instances. Nine cases were observed in the pustular stage, of which eight gave positive results. Eight cases were examined in the stage of healing or scaling, and all gave positive results. In one of two cases who died from other cases about two months after recovery from smallpox, these necrotic masses were found.

The process is found especially in the yellow marrow of such bones as the femur, tibia, ribs, sternum, and the body of the vertebræ, and begins by a proliferation of the normal marrow cells. These form masses of cells, whose nuclei are surrounded by much cytoplasm. A few neutrophilic leucocytes are also found in these masses of epithelioid cells, and they soon show a central area of necrosis which often contains fibrin. He only demonstrated micrococci in one case as present in these necrotic masses.

Similar areas are frequently found in the testicle, and this condition is called "orchitis variolosa." In the hemorrhagic smallpox the above changes are usually present in combination with local hemorrhages in the skin and various serous cavities.

#### CHANGES IN THE SKIN.

The first change, according to Unna,<sup>3</sup> consists in an edema and swelling of the epithelium. Many of these cells undergo softening and colliquation, forming a cavity, while others remain as septa, dividing the cavity up into smaller loculi.

The epithelial cells undergo a special degeneration which is known as ballooning, and which affects all of the various layers, even penetrating into the hair follicles. These swollen cells often attain from two to three times their normal size. They sometimes retain their nuclei, but the cytoplasm becomes perfectly clear, and the nuclei are often fragmented. It is a variety of coagulative necrosis. Sometimes two or three nuclei are present in one cell.

The epithelial cells continue to undergo liquefaction, and this causes an increase in the size of the cavity, at the same time mitoses are found in the cells forming the circumference of the cavity. The cells become compressed, and undergo fibrinoid degeneration, forming strands in the cavity which give the reaction for fibrin.

Umbilication is explained by the fact that the degeneration and edema of the epithelial cells takes place more at the periphery of the vesicle. The less swollen centre remains behind. Unna does not believe that the cords of the compressed epithelial cells running through the vesicle act as guy ropes, but that the edema and compression is exerted more at the sides of the vesicle, and thus this portion of the lesion extends beyond the less compressed centre.

In the vesicular stage an exudation of serum takes place, and neutrophilic leucocytes also emigrate from the vessels into the vesicle forming the pus of the vesicle. These infil-

trate the cutis, and also soon fill the vesicle, producing the pustular stage of the disease. This primary invasion of leucocytes is due to the smallpox poison, but often at the end of the first week there is a second leucocytic invasion, due to a secondary infection with the pyogenic cocci.

#### •HEALING.

As the pustule begins to dry, a scale or crust is formed, and the lesion is invaded by sprouting projections of newly-formed epithelial cells. The upper layers become horny, the lower layers form the other normal cellular layers. In order not to form a scar, the newly formed epithelial cells must grow in an even layer with the convex surface downward, and the stratum Malpighii must not have been destroyed by the process of degeneration.

#### PLASMA CELLS.

There is one change which should be mentioned in this connection, and that is the appearance of the plasma cells in the corium. It is held by many that the injury caused by the poison to the epithelial cells is the very first change which is apparent. Dr. Gilchrist, however, has kindly loaned me some sections made from very early papules, and although the epithelial cells show little or no changes, the cutis shows a marked infiltration with plasma cells. These are usually collected about small arteries and capillaries.

Dr. Gilchrist is of the opinion that this plasma-cell invasion is the earliest change to be noted in smallpox, and this opinion accords very well with the best conception of the method of infection.

It is inconceivable that the poison comes in contact with every portion of the skin at practically the same time, thus causing infection. It seems more rational to believe that the cause is inhaled and that by means of the circulation it reaches the skin, where it causes widely distributed lesions.

The primary exudation of the plasma cells from vessels followed by the various epithelial lesions supports this theory.

#### PATHOLOGICAL STUDY.

The following pathological study was made from a series of five autopsies performed during the past year, and from sections and cultures in six non-fatal cases.

All of the cultures in the non-fatal cases were made from vesicles or early pustules, and in every case they remained sterile. Five sets of cultures were made from the autopsies, and in all of these cases the condition had advanced well into the pustular stage. Four cases gave a pure growth of the streptococcus pyogenes from the pustules, and one case of hemorrhagic smallpox showed the presence of the staphylococcus pyogenes aureus.

Various attempts were made to cultivate the specific cause of the disease. Material from bacteriologically sterile pustules was inoculated into eggs, on the surface of coagulated egg albumen, and in 1 per cent. sterile milk, as this is said to be a good nutrient material for amebae. All of the results were negative.

#### PATHOLOGICAL CHANGES IN SMALLPOX.

In two of the five cases the respiratory tract was the seat of extensive changes. The inner surface of the larynx and trachea were both almost entirely covered with a dirty yellowish pseudomembrane. The under surface of the epiglottis was also involved.

#### HISTOLOGICAL CHANGES.

The primary condition consisted in an extensive degeneration of the lining epithelium. Often the limiting membrane of the nucleus was destroyed, and the chromatin was scattered as a fine dust through the cytoplasm, showing the condition known as nucleorhexis. Hyperchromatosis and

irregularity in the size and shape of the nuclei also existed. These changes result in complete granular necrosis of the epithelium, and cause a necrotic layer without fibrinous deposits.

The submucous coat is often separated from the mucous coat by an exudation of fibrin and serum, and the former coat, together with the muscular coat, are richly infiltrated with plasma cells, small lymphocytes and cells resembling epithelioid cells. Even the cartilage cells show changes, consisting in the disappearance of the cytoplasm of the cell. The cell often forms an empty vacuole, with the nucleus forced to one side.

Streptococci in great numbers were stained in the masses of superficial necrotic cells, and in the vessels of the submucous coat.

#### LUNGS.

The pleural surfaces of one case were dotted by vesicles about the size of a number six shot. These were very numerous, and on microscopic examination they seemed to be large lymph spaces distended with a serous fluid. One case showed a fibrinous pleurisy, and in three cases bronchopneumonia existed.

In two of the cases the typical necrotic areas existed, which are so characteristic of smallpox. These consisted of a central area of coagulative necrosis containing numerous groups of streptococci. The necrotic centres were surrounded by a zone of cells, consisting of small lymphocytes, proliferated alveolar endothelial cells, and a few leucocytes. Both the necrotic area and the surrounding cells show masses of nuclear fragmentation, and many of the cells simply form a mass of granular debris.

The presence of actual bacteria in such large numbers in local necrotic areas is a departure from the usual rule, as in typhoid fever, eclampsia, diphtheria, and other diseases showing these changes, the bacteria are not present neces-

sarily, and the change is probably due to the toxin, or mechanical effects of cellular or fibrinous thrombi. Figure 1 shows streptococi in an exudate in an air cell. Fig. 1 a shows the curious vesicles which were found on the pleural surface of both lungs in one of the cases of smallpox. At "a," two large distended clear spaces are seen, and "b" shows the normal lung tissue.

#### HEART MUSCLE.

##### *Histological Pathology.*

In three cases the nuclei of the cardiac muscular fibres showed great irregularities in size, many being small and shriveled. Others were enlarged, irregular, oval or round, and stained more lightly than normal. In one case there was evidence of longitudinal splitting of the fibres, on cross section a central channel, containing radiating smaller connecting lines resembling a fine tooth comb, being present.

#### THE LIVER.

The livers in all cases were enlarged and yellowish, but very little fatty change was found microscopically. Cloudy swelling, the accompaniment of all acute infections, was always present. Under the microscope the enlargement was found to be due to congestion and cloudy swelling, and no fatty areas were seen. In one case a few collections of proliferated endothelial cells and small lymphocytes were present without actual general necrosis, and in another case necrotic areas, somewhat similar to those described in the lung, were detected. These two different varieties of necrosis of the liver correspond to those described by Councilman<sup>4</sup> and Mallory in their studies of the liver in diphtheria. The first variety they called disseminated necrosis, and these usually only consist of a collection of cells of various types. The liver cells present are necrotic and broken down, and the nuclei showed various stages of degeneration.



Among the necrotic liver cells a few proliferated endothelial cells and leucocytes are usually found.

Although these changes were only made out in the liver of one of the five cases, the degeneration of the liver cells and the proliferation of the endothelial cells could be made out in these small areas, which in this particular case usually consisted of about twenty-five cells.

In one case, that of a child two years old, the so-called central necroses of Councilman and Mallory were detected in the liver. These usually occur near the central vein in diphtheria, but in the one case of smallpox they were found in connection with the portal systems, and even in the middle of the lobules. They simply consisted of large collections of broken down necrotic masses of a homogeneous material resulting from the destruction of liver cells. These areas took on a brilliant red stain when treated with methylene blue and eosin. The necrotic areas are marked by large collections of nuclear detritus, and the destruction of liver cells can be well made out on the edge of the areas. The protoplasm of the cells coalesces into homogeneous masses, and in the early stages of destruction the chromatin of the nucleus breaks up into large irregular fragments, which are scattered through the cytoplasm of the cells. This was in a case of general streptococcus infection, but streptococci did not seem to play any important part in the production of these areas as particulate bodies. A few streptococci were found on the edge of these areas, but they were not detected in the middle of the necrotic material. Throughout the rest of the liver large groups of streptococci were found in the capillaries and spaces between the endothelial cells and liver cells. It would seem, therefore, that excluding the cause of smallpox, that these areas are caused by the soluble products of the secondary invader, the streptococcus pyogenes.

Figure 2 shows a typical area of central necrosis. At "a" the normal liver structure is seen, while "b" shows the outer zone of necrosis in which many liver cells can be made

out in various stages of degeneration. Remains of the protoplasm and nucleus can still be made out. At "c" the central zone of complete structureless necrosis with intense nuclear fragmentation can be made out.

#### MICROSCOPIC EXAMINATION OF THE KIDNEY.

Extensive changes were found in every kidney examined.

In one case the acute interstitial nephritis, described by Councilman<sup>5</sup> in cases of scarlet fever and diphtheria, was found. The kidneys were enlarged, and the tubules were separated from each other by cellular infiltration. This infiltration also often surrounded the glomeruli outside of the capsule. These cells are not leucocytes, but are much larger, and the nucleus stains very deeply and is usually placed excentrically at either end of the cell. Councilman believes that in some way these cells are derived from the small blood vessels, as they are often found within these vessels. He also thinks that their irregular shapes indicate that they are ameboid, and he identifies them as Unna's plasma cells. According to him they are large lymphocytes, and they emigrate from the vessels in acute interstitial inflammation of the kidney. They are very numerous in the spleen and bone marrow, and are probably found principally in these situations.

In one very malignant confluent case the kidney was the seat of most interesting lesions.

On looking at some of the glomeruli, with the low power, they seem partially changed into hyaline masses, and the high power shows that this condition is due to numerous large or small droplets of a clear hyaline material within the lumen of the capillaries. This condition is apparently due to an actual degeneration of the endothelial cells of the glomerular capillaries, since many of these can be seen in the various stages of degeneration. The nuclei seem to swell and take up a much paler stain than normal, and the

cytoplasm breaks up into round hyaline droplets of various sizes, which often coalesce into large confluent drops, apparently obstructing and distending the capillary lumen.

Sometimes the chromatin of degenerating endothelial cells becomes increased in amount and granular.

The epithelial cells lining the capsular space also frequently proliferate, which compresses the capillary network into an irregular mass. They can be distinguished from the endothelial cells of the capillaries by their larger vesicular more lightly staining nuclei, and by the greater amount of eosin-staining cytoplasm. These proliferating capsular endothelial cells show a great tendency towards hyaline degeneration, which seems to begin by an increase in size of the nucleus, while the cytoplasm turns to round hyaline drops of various sizes. The nucleus takes on a paler stain with haematoxylin, and finally disappears in the hyaline material, which becomes confluent, forming large round or oval drops.

Sometimes the hyaline material forms a large crescentic mass of homogeneous clear material in the capsular space.

The epithelium of the convoluted tubules is swollen, and the cytoplasm of the cells contains numerous granules. Many of the cells, however, have undergone a much greater change. The cytoplasm is completely transformed into a mass of clear droplets of about the average size of from three to ten times the diameter of a micrococcus. The nuclei are usually well preserved, although the cells are often swollen to about twice their natural size, and simply consist of a mass of granules. These degenerated cells finally break up and the granules become free in the lumen of the tubule. Here they seem to coalesce into hyaline casts. The limbs of Henle are often distended and filled by casts of clear hyaline material. These areas of degeneration do not stain by Van Gieson's stain, and are therefore not true hyaline. When stained by Weigert's fibrin stain, however, both the clear droplets and the casts take up a deep purple stain.

This is the reaction for fibrin, and the degeneration must be of a fibrinoid character. The formation of the hyaline casts from the degenerated cells can also be clearly made out, as many purple droplets are seen gradually coalescing to form casts taking the same stain. This is of interest concerning the somewhat doubtful origin of hyaline casts, and it would seem clear that in this instance they were formed from degenerated cells of the tubules undergoing fibrinous change. The formation of casts from somewhat similar large droplets has been described by Councilman and Mallory in diphtheria. These large droplets in the degenerated tubular epithelium of the cortex stain a deep blue color by Mallory's connective tissue stain, and the hyaline casts present stained also blue by this stain. Councilman and Mallory think that both the hyaline and granular casts are formed from these products of cell destruction.

When these degenerated cells are stained by osmic acid, and then counterstained by safronin, eosin or other stains, many of the smaller granules take up the black fat stain, but many remain colored by the safronin or eosin.

There are therefore fatty and fibrinous changes side by side in the same cell.

Figure 3 shows the lesion of acute interstitial nephritis under the low power. At "a" the cellular infiltration can be made out surrounding several convoluted tubules, and at "b" several glomeruli can be made out in the midst of an area of intense cellular invasion. This picture can be viewed with advantage by using a hand lens. Figure 4 shows the same condition under a higher power. In the centre of the photograph at "a", there is an atrophied, compressed glomerulus completely surrounded by the cellular exudation of plasma cells. This exudation also separates many of the convoluted tubules from each other.

Figure 5 shows the degeneration of the epithelial cells of the tubules very well. The specimen was first stained by eosin, and then by Weigert's fibrin stain, and the cytoplasm

is broken up into the large granules seen in the picture. These granules usually take up a deep blue stain by this method, thus giving the reaction for fibrin. The tubule marked "a" shows this degeneration, and at "b" a degenerated cell can be seen whose nucleus is still present. At "c" the tubule contains many desquamated, degenerated cells free in the lumen. Many of these cells have lost their nuclei, and some of them show the granules mentioned above. Figure 6 shows a similar condition, and at "a" the tubule contains a granular cast which in the stained Weigert specimen takes up a light blue stain. It seems that these granules gradually coalesce into casts of a hyaline or granular nature.

#### CHANGES IN THE SPLEEN AND OTHER VISCERA.

The spleen was large and soft in two cases, and of normal size and consistency in three instances. Microscopically, nothing was found except acute congestion of the splenic spaces. The stomach, small intestines, large intestines, bladder, diaphragm, voluntary muscles, and pancreas were normal in those cases examined. The granular layer of the medulla of the adrenal gland in one case contained areas of cellular infiltration without necrosis. These consisted of small lymphocytes and cells of an endothelial type.

#### LESIONS IN THE SKIN.

No lesions of the skin were noted which have not been previously described, but the primary exudation of plasma cells has not been especially emphasized in Unna's description. These plasma cells are probably derived in part by proliferation from the endothelium of the lymph spaces and lymph vessels.

In some of the sections made from very early cases, the epithelial cells do not show any great injury, but the cutis is swollen, and there is an increased number of plasma cells in

the lymph spaces, and around the small blood vessels. The condition resembles the response to some injury, and seems to be the first change in the skin, since the various changes in the epithelial cells are not yet present. Some of these cells have an eccentric nucleus, and resemble the cells found by Councilman in the hyperplastic bone marrow in diphtheria. Other cells in these groups exactly resemble the endothelium of small vessels, and are probably derived from lymph spaces and small vessels by proliferation. The typical plasma cells are thought by Councilman to be emigrated large lymphocytes.

Figure 7 shows the primary cellular infiltration which seems to precede the injury to the epithelial cells. At "a" can be seen a normal layer of epidermis, and beneath this in the corium at "b" there is a large collection of the so-called plasma cells. Smaller groups are scattered through the corium at other points, and since the epithelial cells show no injury, this cellular infiltration seems to represent the primary lesion of the skin.

The next change in the earliest lesions was edema and swelling of the epithelial cells, followed by contraction of the nucleus. This often became fragmented and broken up into small granular masses. The exudation of leucocytes and serum, and the liquefaction of the epithelial cells was also observed.

The various changes in the epithelial cells are well shown in the photomicrographs. Figure 8 begins a series showing the injury to the epithelial cells, and would correspond to the early papular stage of the eruption. At "a" various stages of nuclear atrophy and fragmentation can be made out, and at "b" the great edema and liquefaction of the cytoplasm of cells appears. This is the ballooning process of Unna. The process begins in the stratum lucidum and stratum granulosum. Figure 9 simply shows a continuation of the same process. Figure 10 shows a curious degeneration of the epithelial cells of the stratum granulosum. The

nuclei are shriveled and the surrounding cytoplasm is broken up into circular clear masses resembling fat drops. At "a" the phantom-like outline of these globular, clear masses can be well made out, and this degeneration seems to be a further process in the formation of the vesicle. Figure 11 shows a vesicle originally filled with a clear fluid. At "a," the junction of the stratum lucidum and the stratum granulosum, the layer of epidermis has split, and the layers pass above and below the fluid contents of the vesicle. Several hair follicles are seen at "b," and "c" shows that the corium is free from any participation in the vesicle. Figure 12 shows a smallpox pustule, which has ruptured the lower enveloping layer of epidermal cells. Many neutrophilic cells have thus escaped, and have infiltrated the corium. Such accidents account for the scar formation following smallpox, or the so-called pitting, since the scar must form when fibrous tissue regenerates after inflammation. "A" shows the pustule which has ruptured at "b," and "c" indicates the corium richly infiltrated with neutrophilic leucocytes, and an edematous albuminous fluid. Figure 13 is taken from a section made directly through the area of umbilication in a pustule. It shows very well that the umbilication is simply produced by an edema and purulent infiltration of the sides of the pustule causing a bulging, while the central portion of the pustule, which shows little edema, remains as a depressed centre. At "a," the layers of epidermis are separated by a purulent edematous fluid, and at "b" the exudation is entirely purulent. The central or depressed area of umbilication at "c" shows very little change, and at "d" the lower layer of epidermis has not ruptured, showing a normal subcutaneous layer at "e." The crater-like depression of umbilication is well shown. Figure 14 shows a mass of interlacing filaments of fibrin, including pus cells within the meshwork. This exudation of fibrin is often seen in smallpox pustules, especially when there is a mixed streptococcus infection. At "a" the network of fibrin is seen ending abruptly at "b," the corium.

In the hemorrhagic case, the cells of the stratum granulosum showed various stages of nuclear degeneration, and the edema of the cytoplasm with typical ballooning was observed. The capillaries and lymph spaces of the corium were greatly distended by red blood corpuscles, and numerous hemorrhages were present in the connective tissue. The epidermis was not invaded by red blood corpuscles.

#### CHANGES IN THE TESTICLE.

Necrotic changes were noted in the testicle in two cases, and the various stages could be well traced out. The process seemed to begin by a necrosis of the epithelial cells of the seminiferous tubules. The nuclei of these cells showed marked karyorhexis, and the protoplasm of the many cells was necrotic and granular. In the later stages, large areas of necrosis can be seen to particularly consist of seminiferous tubules which have coalesced into masses with central areas of coagulative necrosis, with nuclear fragmentation, surrounded by a thick zone of necrotic cells. The intertubular connective tissue is thickened, and even the walls of the arteries have undergone necrosis with nuclear fragmentation.

Figure 15 is a good representation of the necrotic areas found in the testicle. At "a" a few normal seminiferous tubules are present, which at "b" are gradually undergoing necrosis, with loss of contour. The area marked "c" consists of a necrotic mass of coagulative necrosis with much nuclear fragmentation. Figure 16 at "a" shows the seminiferous tubules under a higher power, and many of the epithelial cells show fragmentation or loss of their nuclei. The gradual transition of these injured tubules into necrotic material is also well shown.

#### SECONDARY BACTERIAL INFECTION.

This is a point of general importance, as the rapid advance of serum therapy towards a remedy for combating septicemia bears directly upon this matter.



It is now well known that many typhoid cases, and perhaps the majority of the eruptive fevers, die not so much from the primary cause, as from secondary infection with the streptococcus pyogenes.

This streptococcus infection is the most striking feature of fatal smallpox, and the course of infection can be traced from the skin to the general circulation.

As mentioned above, the cultures from vesicles in early and mild cases of smallpox remained sterile, but after the secondary fever the pustules often contain streptococci in abundance.

Four of our fatal cases contained streptococci in the pustules, and various viscera, such as the heart, liver, kidney, spleen, lymph glands, pancreas and lung. One showed a general infection with the staphylococcus pyogenes aureus.

On staining by Weigert's stain for bacteria, streptococci could be demonstrated in the pustules of the skin, and in the lymph spaces of the corium.

From this point they are carried to the lymphatic glands by the lymph current, and stained sections from the cervical and bronchial glands gave a remarkable picture.

In the cortex of the glands, usually just beneath the capsule, there were extensive focal necroses. The lymph-sinuses were greatly distended, and the necrotic areas often contain neutrophilic leucocytes. When these glands are stained by Weigert's method, many of the necrotic areas are seen to consist almost entirely of masses of streptococci. There are also many streptococci in the lymph sinuses of the glands. The arteries and capillaries also contain streptococci, and there are fibrinous thrombi in many of the lymph channels of smaller glands. This condition was found in the cervical and bronchial glands, showing the absorption of streptococci from the pustules of the skin, and the diseased mucous membrane of the bronchus.

These organisms then enter the general circulation, causing general septicemia, and bacteria were demonstrated in stained sections from the kidney, liver, lung, and testicle. The bacteria were in the necrotic areas of the lung, and also in the interlobular capillaries of the kidney, the lymph spaces of the portal system, the capillaries of the liver, the perivascular lymph spaces of the lung, the necrotic epithelium of the bronchi, and the veins and lymph spaces of the thymus gland, which also contained thrombi. The presence of the pyogenic bacteria in the skin and lymphatic glands has already been mentioned.

Ewing<sup>6</sup> found streptococci in the heart's blood in 29 cases of smallpox, and Arnaud<sup>7</sup> obtained this organism in two cases from the blood of the heart during life.

#### TENDENCY TOWARDS GENERAL THROMBOSIS.

Many of the viscera contain fibrinous thrombi in the small blood vessels and lymphatics, and these lesions are usually very pronounced in the blood vessels of the lung, spleen and lymphatic glands. Large masses of fibrin are very frequent in the vessels of these viscera, and Figure 17 shows the beginning of fibrin formation and thrombosis in a blood vessel of the lung. The strands of fibrin are well shown at "a," and at "b" lymphocytes and neutrophilic leucocytes are to be observed. "C" shows the mass of red blood corpuscles and "d" the open spaces of surrounding air cells. Figure 18 is a photograph of a lymphatic gland, and at "a" the fine network of a fibrinous thrombus of a lymphatic vessel can be seen. Figure 19 shows a collection of short chains of streptococci into masses, and represents a very frequent picture in smallpox sections. The large masses of organisms found in various viscera are often startling, and they might almost be described as emboli of micro-organisms. The photomicrograph was made from an area of thrombosis in a vessel in the lung, and shows the micrococci collecting into masses resembling the agglutination of other organisms.

## SUMMARY.

Although we have only studied five cases of smallpox, yet some conclusions can be drawn from the work.

The early skin lesions indicate that the primary infection in smallpox takes place in the lungs, probably by inhalation. The poison, when it enters the circulation, shows a selective influence on the epithelium of the skin and respiratory tract, and many cases are probably not further affected.

The serious and fatal lesions of smallpox are caused by the secondary infection from the skin and respiratory tract, and the infectious agent is usually the streptococcus pyogenes. This organism is so distributed throughout the lesions as to explain most of the visceral changes, such as local necrosis, and the various pulmonary changes.

This streptococcic septicemia is the most striking feature of fatal smallpox, and if it were possible to overcome this condition by a special serum, the mortality from the disease would be greatly reduced.

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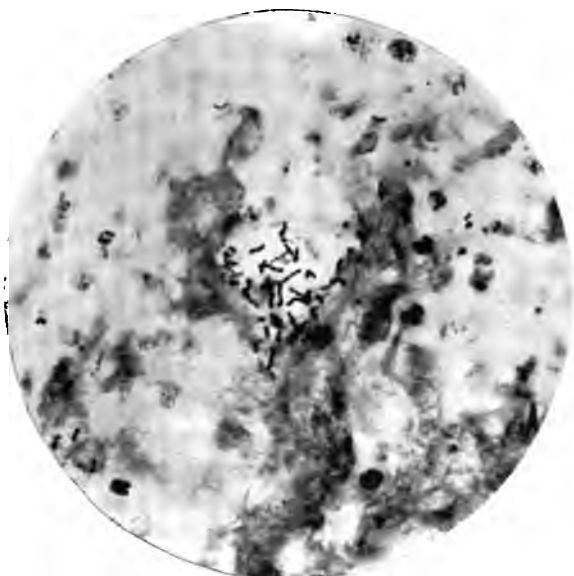


FIG 1

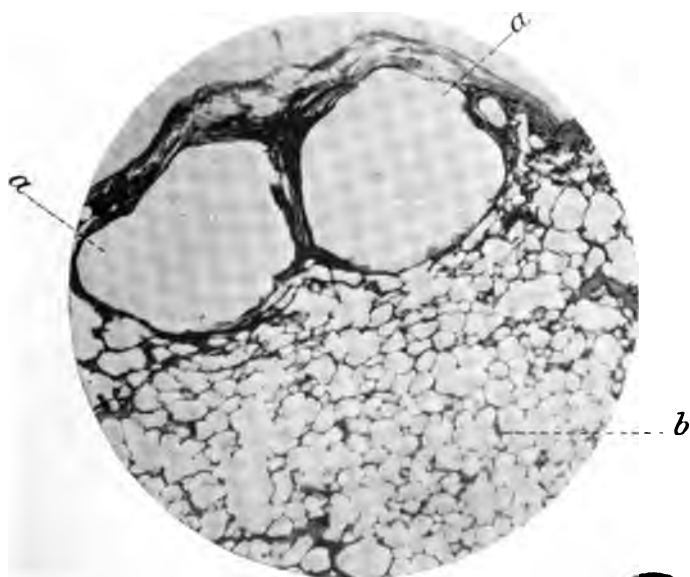


FIG. 1a

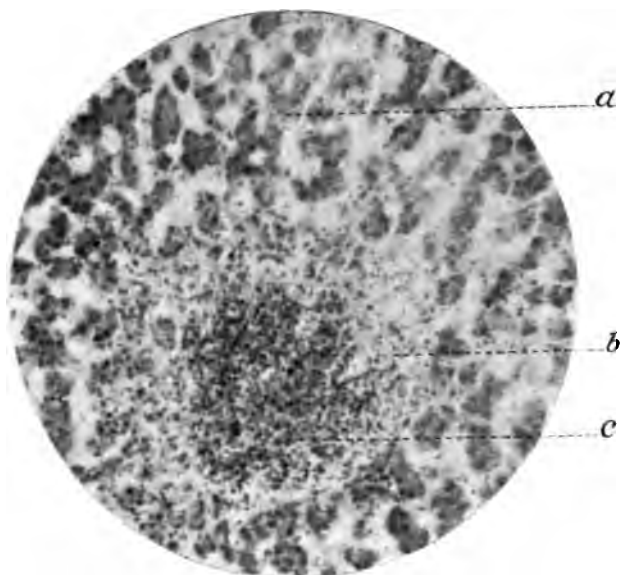


FIG. 2



FIG. 3

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7. Arnaud. Rev. de Med. 1900, p. 303.

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## DESCRIPTION OF PHOTOMICROGRAPHS.

Figure 1. Section of lung of smallpox case showing a purulent exudation in an air cell containing streptococci.—*Dr. C. H. Potter.*

Figure 1 a. Section of lung and pleural surface showing large spaces on the pleural surface filled originally with fluid. These pseudo-vesicles of the pleura are shown at "a," and "b" indicates the normal lung tissue.—*Dr. C. H. Potter.*

Figure 2. Section of liver showing a typical area of central necrosis. The zone at "a" shows the rows of liver cells separated by capillaries, and "b" shows the outer area of necrotic liver cells in various stages of destruction. At "c" the complete structureless zone of necrosis can be made out.—*Dr. C. H. Potter.*

Figure 3. Section of kidney under low power showing areas of cellular infiltration especially marked at "a" and "b." At "a" a large area of cellular infiltration around several convoluted tubules can be made out, showing the lesion of acute interstitial nephritis.

Figure 4. Section of kidney showing acute interstitial nephritis under a higher power. At "a" a large group of plasma cells are seen surrounding a glomerulus and separating several tubules from each other.—*Dr. C. H. Potter.*

Figure 5. Section of kidney showing the special fibrinous degeneration of the epithelium of the convoluted tubules. "A" indicates the granules in the degenerated cells staining by Weigert's method, and at "b" a cell almost entirely degenerated is seen. At "c" a number of degenerated epithelial cells in the lumen of a tubule can be seen, and many of these cells contain these granules.—*Dr. C. H. Potter.*

Figure 6. Section of the cortex of the kidney showing the same degeneration as Fig. 5. At "a" a cast which stained by the fibrin stain is seen, showing the formation of the casts from these granular bodies.—*Dr. C. H. Potter.*

Figure 7. Section of the skin showing the primary infiltration of the corium by the plasma cells. This is shown at "b", and "a" demonstrates that the epithelium is not yet injured.—*Dr. J. S. Fulton.*

Figure 8. Section through the epidermis in the papular stage. At "a" various stages of nuclear atrophy and fragmentation are seen, and at "b" the great edema and liquefaction of the cytoplasm of the cells can be made out. This is an example of the earliest epidermal changes in smallpox. The change in the cells at "b" is called the ballooning process, owing to the distended condition of the swollen cells.—*Dr. C. H. Potter.*

Figure 9. Section through the epidermis. This shows a continuation of the process described in Figure 8. The various layers of the epidermis are shown in various stages of degeneration, and some of the cells are swollen to about three times their normal size, and the granular cytoplasm is replaced by a clear fluid. Some of the nuclei are present, but many of the epithelial cells have lost their nuclei. This is the stage which precedes the vesicular stage.—*Dr. C. H. Potter.*

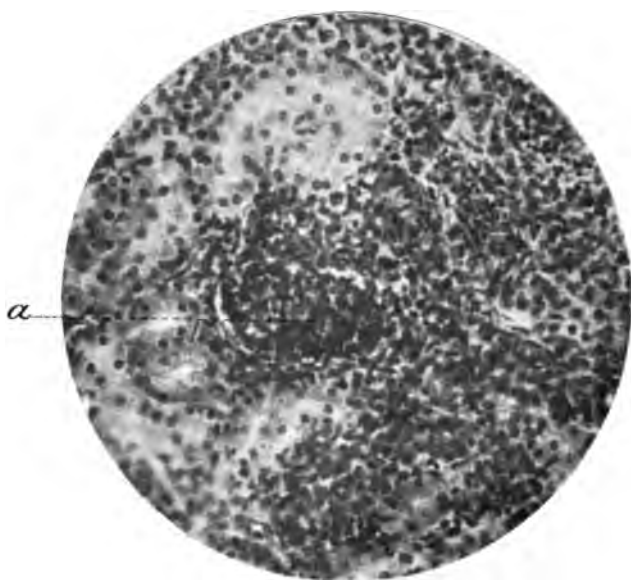


FIG. 4

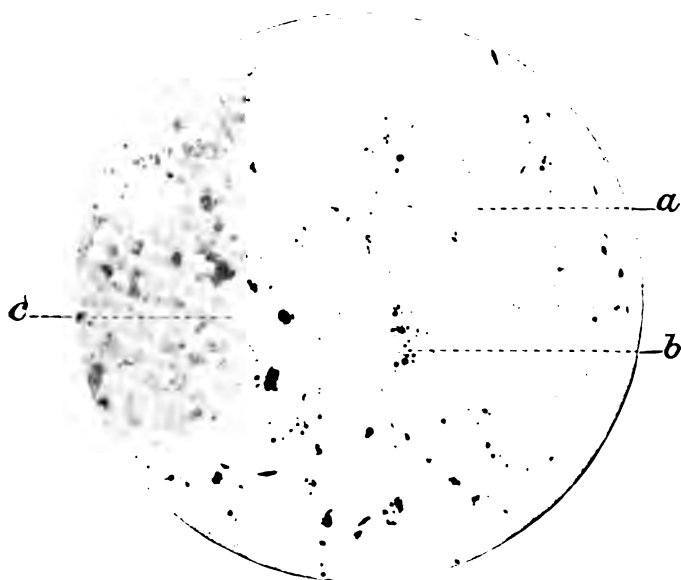


FIG. 5





FIG. 6.

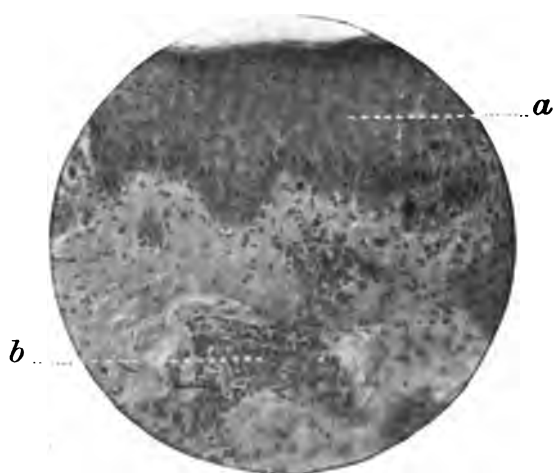


FIG. 7

**Figure 10.** Section through the epidermis showing a curious degeneration of the cells. The nuclei are shriveled, and the cytoplasm surrounding the nuclei is broken up into circular masses like fat drops. At "a" the phantom outline of these globular masses can be seen, while in the upper part of the picture the epithelium shows normal nuclei and cytoplasm.—*Dr. C. H. Potter.*

**Figure 11.** Section through the skin showing a vesicle originally filled with a clear fluid. At "a," the junction of the stratum lucidum and the stratum granulosum, the layer of epidermis has split, and the layers pass above and below the fluid contents of the vesicle. This thin layer is unruptured, and the corium at "c" shows no infiltration. At "b" several hair follicles are seen.—*Dr. C. H. Potter.*

**Figure 12.** Section of a pustule which has ruptured at "b," where the break in the rete Malpighii can be seen. "A" shows the pustular contents of the pustule, and "c" indicates the intense purulent infiltration of the corium. This explains the pitting, as in these cases the scar must always follow the inflammation of connective tissue, while the unruptured pustule will regenerate its epithelium without scar formation. The adjacent normal epithelium can be seen at the upper portion of the picture.—*Dr. C. H. Potter.*

**Figure 13.** Section through the central portion of a pustule showing the phenomenon of umbilication. The crater-like depression is seen at "c," and below this the various layers of the epidermis show very little swelling, edema or other changes. The edema and purulent infiltration to either side can be well seen. At "a" the layers of epidermis are separated by a sero-purulent fluid, and at "b" the exudation is entirely purulent. At "d" the lower layer of the epidermis is unruptured, and the corium shows no infiltration. This section shows the reason for umbilication very well.—*Dr. C. H. Potter.*

Figure 14. Section at the base of a pustule just adjacent to the corium. This shows the fibrinous network, including pus cells often seen in pustules. At "a" this network is shown, and "b" shows a corium infiltrated by plasma cells. At the lower portion of the section a small vessel surrounded by plasma cells is seen.—*Dr. C. H. Potter.*

Figure 15. Section of testicle showing the necrotic areas. "A" indicates the fairly normal seminiferous tubules, "b" the tubules undergoing necrosis and destruction, and "c" shows the completely necrotic zone with intense nuclear fragmentation.—*Dr. C. H. Potter.*

Figure 16. Section of testicle under a high power, showing at "a" the remains of tubules which have undergone partial necrosis. Their outline as tubules can still be made out, but their gradual transition into necrotic material can be well seen.—*Dr. C. H. Potter.*

Figure 17. Section of lung showing the beginning of thrombosis in a blood vessel. The strands of fibrin are well shown at "a," and "b" shows a few leucocytes. "C" shows a mass of red blood corpuscles, and "d" shows a clear air vesicle.—*Dr. J. S. Fulton.*

Figure 18. Section of lymphatic gland showing at "a" a thrombus consisting of a fine reticulum of fibrin in a lymphatic vessel. The normal lymphocytes are well shown.

Figure 19. This simply shows a large mass of micrococci in a thrombus in the lung. It is meant to show the very large emboli of organisms which often form in the vessels and tissues in smallpox.

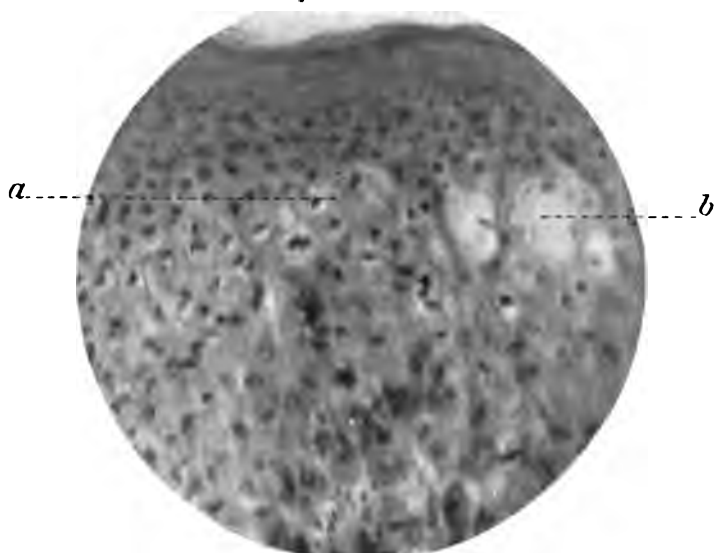


FIG. 8

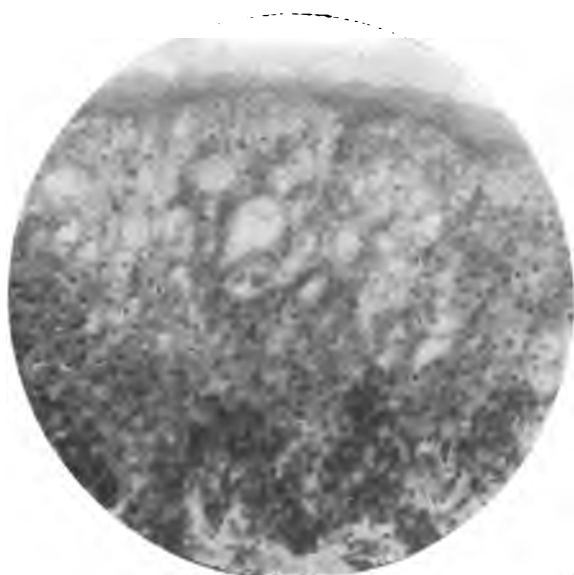


FIG. 9

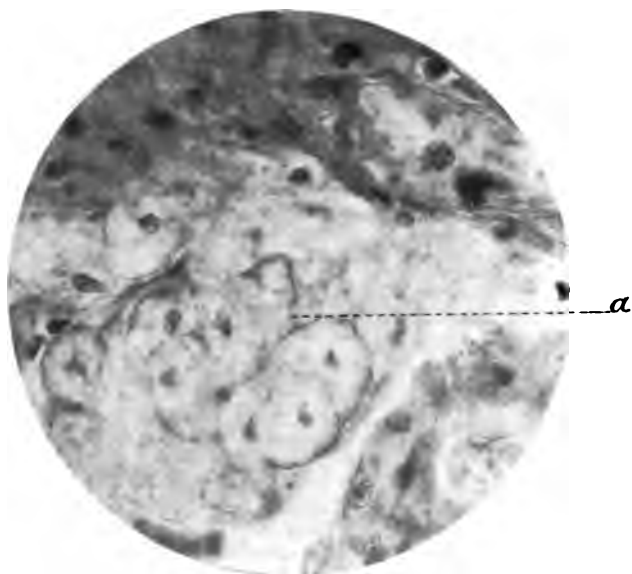


FIG. 10

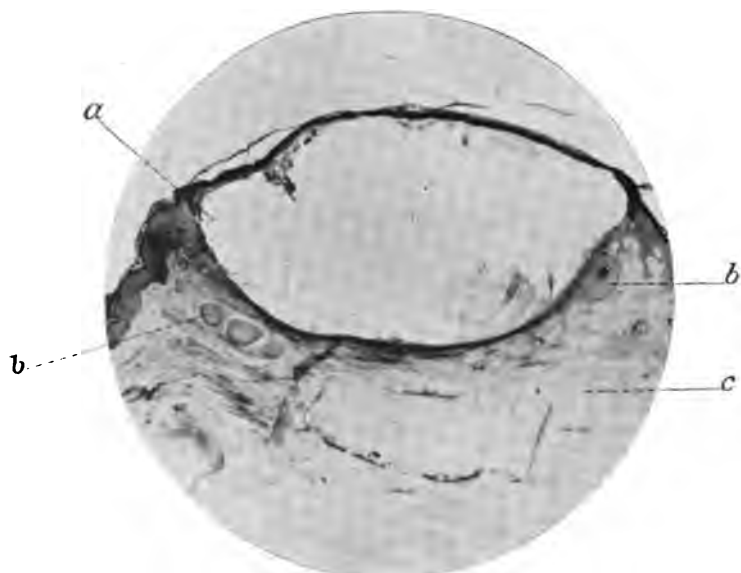


FIG. 11

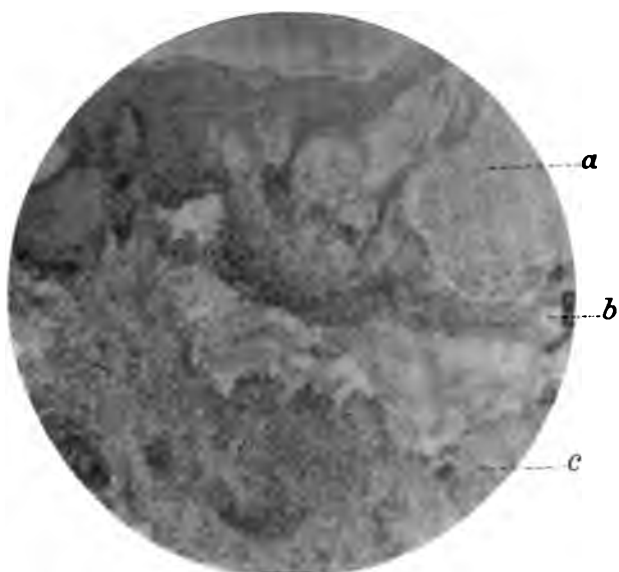


FIG. 12

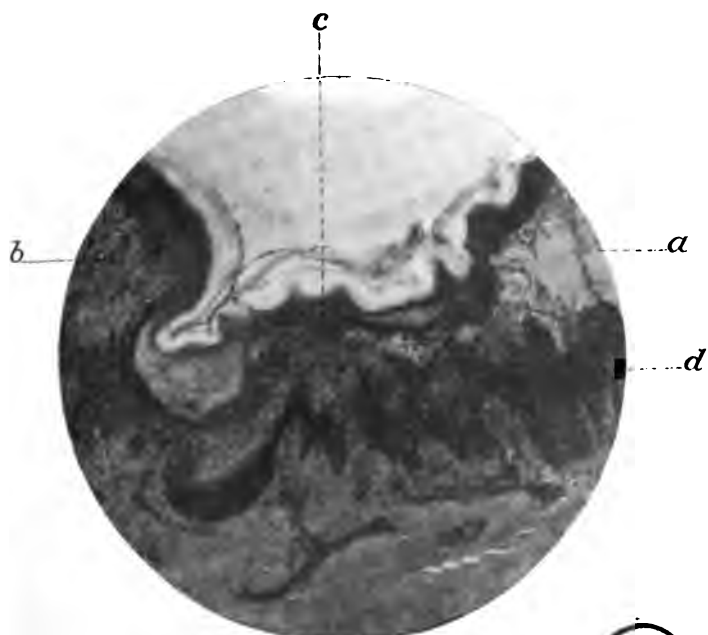


FIG. 13

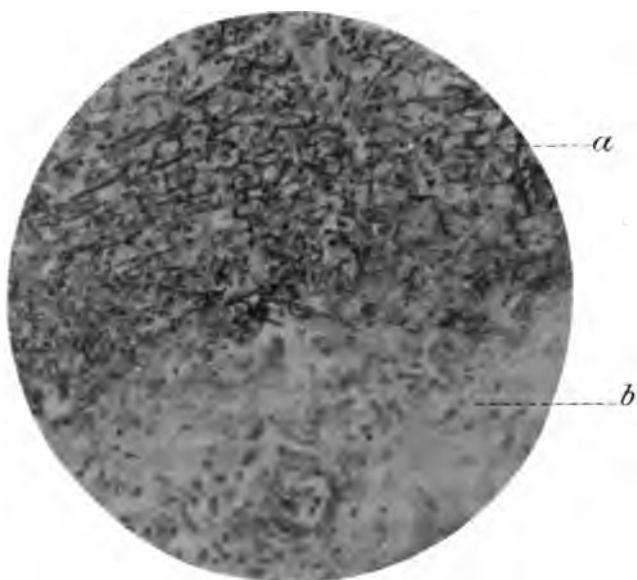


FIG. 14

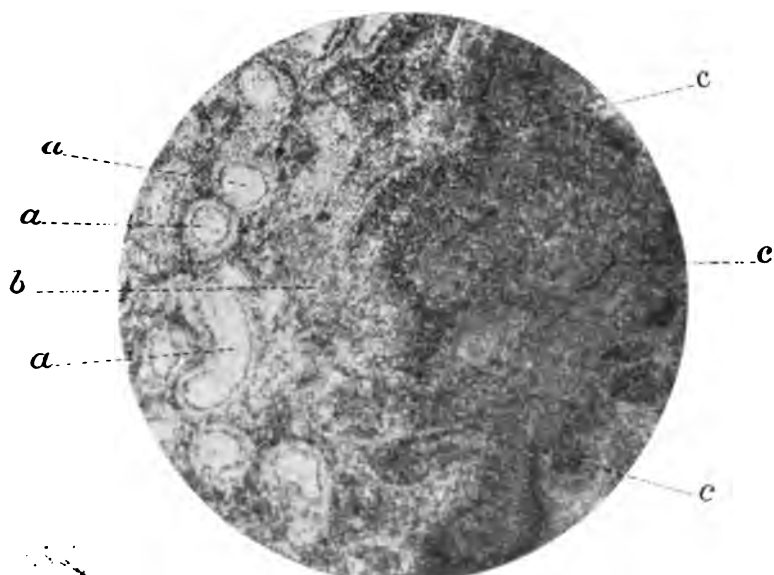


FIG. 15

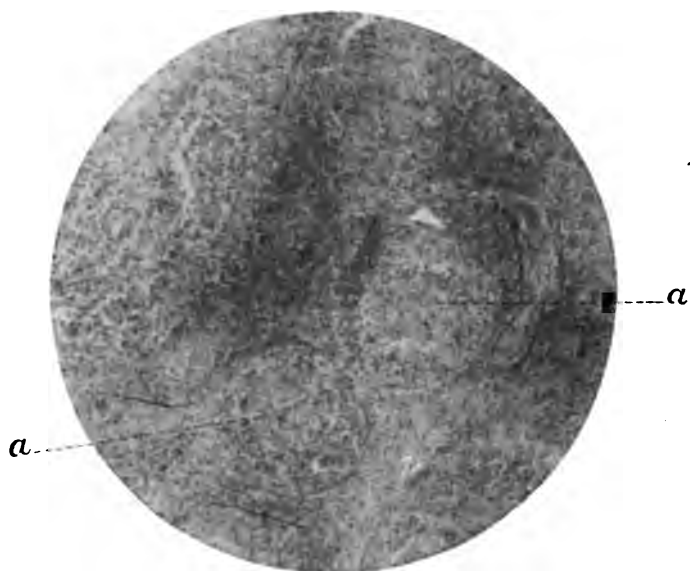


FIG. 16

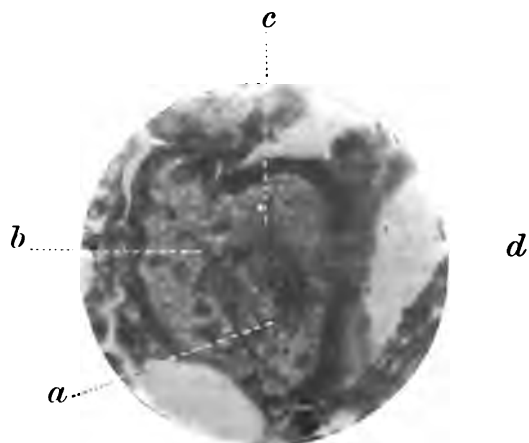


FIG. 17





FIG. 18



FIG. 19

# REPORT.

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BALTIMORE, January 1st, 1903.

DR. JAMES BOSLEY,

*Commissioner of Health.*

DEAR SIR—I hereby respectfully submit my report of the work performed in the Bacteriological Laboratory of the Sub-Department of Health for the year ending December 31st, 1902.

## BACTERIOLOGICAL EXAMINATION OF THE WATER SUPPLY.

### *Report upon the City Water Supply for the Past Year:*

The city water has been repeatedly examined, together with a number of wells and springs. A number of examinations have also been made of the various sources of supply, including the reservoirs and streams. These tests consist in the numerical estimation of the bacteria present in 1 cubic centimeter of water and the tests for the presence of the colon bacillus or intestinal germ.

In order to explain the work upon the water, I have printed the following description of the source of our water supply from a letter kindly sent by Water Engineer Alfred M. Quick:

“Our water supply is derived from two sources, Jones' Falls and Gunpowder River. The Jones' Falls supply is impounded in Lake Roland by a dam near Hollins Station, on the Northern Central Railroad, and the water is sent by gravity from there through a conduit about 4 miles long to

Hampden Reservoir in the city. From Hampden Reservoir the water flows by gravity through 30-inch pipes to Druid Lake, and from Druid Lake water is supplied by gravity to the consumers in the Middle Service.

"The Gunpowder River supply is impounded in Loch Raven by a dam near Loch Raven Station on the Maryland and Pennsylvania Railroad, and the water is sent by gravity from there through a tunnel about 7 miles long to Lake Montebello. From Lake Montebello the water flows through a tunnel about a mile long to Lake Clifton, and from Lake Clifton consumers in the Low Service are supplied by gravity, and consumers in the High Service are supplied by pumping from the Eastern and Mt. Royal Pumping Stations.

"The Upper Service is supplied by the Western Pumping Station in Druid Hill Park, taking water from Druid Lake and pumping to the Standpipe at West Arlington."

Tables No. 1, 1 a and 1 b, which follow at the end of the report at page 89, will show the work in detail on the tapwater, the wells and springs, and the reservoirs and streams.

TABLE No. 1.  
EXAMINATION OF TAP WATER.

TAP WATER.	Date.	COLONIES PER C. C.		Colon Bacillus.	Condition.
		Aerobic.	Anaerobic.		
Laboratory tap.....	Jan. 27.	2,160	0	Negative in 1 and 50 C. C.	Good.
Laboratory tap.....	Feb. 14.	14,640	94	Negative in 1 and 50 C. C.	Good.
Ward 15—1723 West North avenue.....	" 27.	.....	80	Present in 1 and 50 C. C.	Bad.
Ward 17—601 Pennsylvania avenue.....	" 27.	.....	58	Present in 50 C. C.	Bad.
Ward 20—1916 West Pratt street.....	" 27.	.....	70	Negative in 1 and 50 C. C.	Good.
Ward 21—1110 South Paca street.....	" 27.	3,840	11	Negative in 1 and 50 C. C.	Good.
Ward 22—128 West Conway street.....	" 27.	3,900	0	Negative in 1 and 50 C. C.	Good.
Ward 23—1508 South Charles street.....	" 27.	3,780	0	Negative in 1 and 50 C. C.	Good.
Ward 24—1417 Riverside avenue.....	" 27.	.....	0	Negative in 1 and 50 C. C.	Good.
Ward 13—248 Roland avenue.....	" 28.	.....	0	Negative in 1 and 50 C. C.	Good.
Laboratory tap.....	March 12.	1,461 Gel. 852 Agar	0	Present in 1 and 50 C. C.	Bad.
Laboratory tap.....	April 10.	1,130 Gel. 1,740 Agar	21	Negative in 1 and 50 C. C.	Fair.
Laboratory tap.....	May 21.	588	157	Present in 1 C. C.	Bad.
Laboratory filter—3 weeks' use.....	" 29.	8,400	0	Negative.....	Bad.
Laboratory tap.....	June 28.	1,356	98	Negative.....	Fair.
1613 Hopkins avenue.....	July 10.	150	120	Negative.....	Good.
Laboratory tap—Raw water.....	Aug. 31.	135	34	Negative.....	Good.
Filtered water—Lab. filter.....	" 31.	50	15	Negative.....	Good.

TABLE No. 1—Continued.  
EXAMINATION OF TAP WATER.

TAP WATER.	Date.	COLONIES PER C. C.		Colon Bacillus.	Condition.
		Acrobic.	Anaerobic.		
Filter from Dr. B's.....	Sept. 16.	15	0	Negative.....	Good.
Laboratory tap.....	" 22.	685	8	Negative.....	Good.
Court House filter.....	" 24.	263	31	Negative.....	Good.
215 North Chester street—Tap.....	" 24.	7560	820	Negative.....	Bad.
Laboratory tap.....	" 24.	1090	300	Negative.....	Fair.
Laboratory tap.....	" 25.	360	250	Negative.....	Fair.
Laboratory tap.....	" 29.	50	10	Negative.....	Good.
Court House—Raw water.....	Oct. 4.	620	0	Present in 1 C. C.....	Bad.
City tap.....	" 11.	1000	300	Present in 1 C. C.....	Bad.
Laboratory tap.....	Nov. 10.	690	62	Present in 1 C. C.....	Bad.
Laboratory filter.....	" 10.	780	1	Present in 1 C. C.....	Bad.
411 West Conway street—Tap.....	" 20.	90	1	Present in 1 C. C.....	Bad.

TABLE No. 1 A.  
EXAMINATION OF WELLS AND SPRINGS.

WELLS AND SPRINGS.	Date.	COLONIES PER C. C.		Colon Bacillus.	Condition.
		Aerobic.	Anaerobic.		
Wyman's Estate, Spring.....	June 13.	15,000	600	Present in 1 C. C. ....	Bad.
200 Hickory avenue, Pump.....	" 14.	35	5	Present in 1 and 50 C. C. ..	Bad.
111 Stafford street, Well.....	July 10.	100	1	Present in 1 and 50 C. C. ..	Bad.
Oak and Twenty-seventh street, Pump.....	" 15.	350	80	Present in 1 and 50 C. C. ..	Bad.
2852 Pennsylvania avenue, Pump.....	" 19.	.....	.....	Present in 1 and 50 C. C. ..	Bad.
Reservoir street, Druid Hill Park.....	" 31.	3	1	Negative.....	Good.
Fred. Hemp, Gelston Heights, Franklin road, Pump.....	" 31.	250	50	Negative.....	Good.
John Barley, Franklin road, Pump.....	" 31.	500	70	Present in 1 and 50 C. C. ..	Bad.
George Knoop's Farm, Edmondson avenue, Pump.....	" 31.	5,000	600	Present in 1 and 50 C. C. ..	Bad.
H. Gelston, Gelston Heights, Well.....	" 31.	250	8	Negative.....	Good.
G. W. S. Jackson, Franklin road, Well.....	" 31.	2,000	500	Present in 1 and 50 C. C. ..	Bad.
W. S. Whitely, Gilmor lane, Well. ..	Sept. 9.	750	350	Present in 1 and 50 C. C. ..	Bad.
Mr. Hardingham, 242 Sycamore avenue, Pump.....	" 16.	220	12	Present in 50 C. C. ....	Bad.
Mr. Myers, 244 Sycamore ave., Pump.....	" 16.	360	44	Present in 50 C. C. ....	Bad.
Wm. White, 246 Sycamore ave., Pump.....	" 16.	840	12	Present in 1 C. C. ....	Bad.
2500 North avenue, Pump.....	" 24.	225	23	Negative.....	Good.

TABLE No. 1 B.  
EXAMINATION OF RESERVOIRS AND STREAMS.

RESERVOIRS AND STREAMS.	Date.	COLONIES PER C. C.		Colon Bacillus.	Condition.
		Aerobic.	Anaerobic.		
Loch Raven.....	Oct.	2,910	500	Negative.....	Fair.
Peterson's Race—3 Arch Bridge.....	"	240	8	Negative.....	Good.
Loch Raven, below mouth of Peterson's Run.....	"	5,400	220	Negative.....	Fair.
Loch Raven. Gate Chamber.....	22.	6,000	.....	Negative.....	Fair.
Lake Montebello. Gate Chamber.....	22.	4,800	124	Present in 1 C. C.....	Bad.
Lake Montebello. Effluent at Gate Chamber.....	Nov. 3.	.....	.....	.....	.....
Lake Clifton. Influent at Gate Chamber.....	"	870	both 74 agar.	Present in 1 C. C.....	Bad.
Lake Clifton. Effluent at Gate Chamber.....	"	Gel. 1,500	1,320	Negative.....	Good.
Lake Clifton. Mouth of Roland Run.....	"	Agar. 720	460	Negative.....	Fair.
Jones' Falls, above Railroad Bridge.....	"	Gel. 6,000	480	Present in 50 C. C.....	Bad.
Townsend Run, above Back Water.....	"	Agar. 540	360	Negative.....	Fair.
Ellicott's Run at Railroad Culvert.....	"	1,872	24	Negative.....	Bad.
Lake Roland at Gate House.....	"	860	84	Present in 1 C. C.....	Fair.
Hampden Reservoir at Influent Chamber.....	"	756	156	Negative.....	Bad.
Hampden Reservoir at Gate House.....	"	758	240	Negative.....	Fair.
Druid Lake. Screen well.....	"	420	48	Negative.....	Good.
Druid Lake at Influent.....	"	5,100	360	Present in 1 and 50 C. C.....	Bad.
	"	4,200	600	Present in 1 and 50 C. C.....	Bad.
	"	6,000	500	Present in 50 C. C.....	Bad.
	"	6,000	100	Negative.....	Fair.

SUMMARY OF TABLES NO. 1, 1*a* AND 1*b*.

Table No. 1 shows that 16 wells were examined, of which 12 were bad and 4 good. The City water was examined as it flows from the laboratory tap and the taps in various wards in 30 instances, and the colon bacillus, or *Bacillus coli communis*, a proof of intestinal pollution, was found 9 times. The reservoirs and other sources of supply were examined 17 times, as the later part of the table will show. The colon bacillus was present in 7 samples.

Another interesting feature of these tables is the comparison between the bacterial counts of the water as it flows from the City taps and the water in the reservoirs and rivers. The average number of bacteria present in 25 samples of tap water was 2,643, and the average from 17 examinations of the sources of supply was 3,163. The discovery of the badly polluted spring in a place much used by the public and its being labeled prevented its further use.

In 7 samples of tap water which contained colon bacilli the presence of nitrites was detected 6 times, and this seems to generally mean the presence of intestinal pollution, when detected in small quantities of water.

## EXAMINATION OF HOUSEHOLD FILTERS.

During the past year a number of examinations of mechanical household filters were made by Mr. E. H. Schorer, under the direction of the department.

The first series of examinations was made with Filter A, placed on the tap. The object of the tests was to see if a filter, which was sterilized and then dried each day, would remain efficient. Two filters were sterilized in the autoclave and then properly adjusted, and 3 liters (about 3 quarts) of water were filtered through each, and 1 c. c. was plated for the bacterial count. After using the filters No. 1 was plugged with cotton and again sterilized as above, but No. 2



was removed, plugged with sterile cotton and dried in the air for nearly 24 hours. The filters were used daily, filtering 3 liters each day. Plates were made, as the following table indicates:

TABLE A.

Days.....	1st.	2d.	3d.	7th.	48th.	49th.	53d.	54th.
Sterilized daily. 9		17	0	2	14	2	0	4
Bacteria per cubic centimeter.								
Days.....	1st.	2d.	3d.	7th.	48th.	49th.	53d.	54th.
Sterilized once } 9	9	9	6	8	0	1	6	0
Dried daily... }								
Bacteria per cubic centimeter.								

Such filters will remove the great majority of bacteria if small quantities of water are desired, as from 3 to 5 liters, will have most of the bacteria removed. The City water was giving an average of about 600 bacteria.

## EXPERIMENT NO. 2—FILTER B.

This is a filter so arranged that the charcoal and cloth filters can be washed by reversing the current of water. About 5 liters were filtered daily, the flow of water through the filter being quite rapid. The current was reversed daily, so as to keep the filter at its greatest efficiency. The results follow:

Days.....	1st.	10th.	11th.	14th.	15th.
Filter. Bacteria per cubic centimeter.	48	60	100	87	16
City water. 500 bacteria.					

This filter reduced the number of bacteria from 1-5 to 1-10, the number present in the raw water.

## EXPERIMENT NO. 3.—FILTER B.

Same as No. 2, except that in reversing the current, water not only flows in the opposite direction, but water was also flushed into the part containing the cloth filter to cut off the sediment that had been deposited.

Days.....	1st.	2d.	4th.	10th.	16th.	22d.
Bacteria in ...	1,215	2,340	9,000	1,200	282	480
Filtered water.....	1,350	2,520				
City water. 1,090 bacteria per c. c.						

This seems to show that the special scheme to wash the cloth filter daily stirred up a sediment that increased the bacteria even over the raw water. The first type of filter was examined after use for one year, during which time only one cleaning was given the filter. Five hundred and eighty-five and 510 colonies per c. c. on agar were found. The other counts were made on 1 per cent. acid gelatin.

## EXPERIMENT NO. 4—DR. B'S FILTER.

This filter is so arranged that a sheet of rice paper, which can be easily replaced, is used to filter the water. To aid the paper in filtering, a small amount of powdered charcoal is so put into the filter that it will be collected on the rice paper. After one day's use the filter was germ-free. After seven day's use the filtered water contained 3,190 bacteria per c. c. Then a fresh supply of filtering material was put in the filter, and it was allowed to run two days. The counts then showed 9,120 and 9,600 bacteria. This shows that in order to keep the water germ-free the filtering material should be replaced every day.

## EXPERIMENT NO. 5—FILTER D.

After three years and nine months' use the filter gave the following results:

Water before entering the Filter.....	{ 640 } { 600 }	Two estimations.
Water after passing through Sand Filter...	{ 112 } { 96 }	
Water after passing through both Filters ..	{ 168 } { 142 }	
Water from tap in Superintendent's Room.	92	

It is safer to boil the water after filtration, as none of the methods examined rendered the water continuously and absolutely sterile. All of these filters, however, give a fair percentage of removal. This work is incomplete at present, but further work will be done on this subject.

SUMMARY OF THE STUDY OF THE BALTIMORE DRINKING WATER  
FOR THE PAST SIX YEARS.

The routine examination of the drinking water was begun on January 1, 1897, and has continued until the present time. During this period a chemical and bacteriological examination of 495 waters has been made by the City Chemist and myself and the results recorded. The summary of these results will form the basis of the following paper on the water supply of Baltimore.

The Northwestern Police District, comprising Wards 14, 15, 16 and 17, contains about 292 wells, but is mainly supplied by the city supply. Many of these wells have been found polluted and the results are of interest. There are also a few pumps in other districts of the city. The chemist and myself have examined 181 of these pumps together, of which 100 were found polluted by intestinal bacteria, while only 81 were found pure. This shows that the sub-soil is polluted thoroughly.

The number of bacteria present in one cubic centimeter (15 drops) was often excessive. Pure well water certainly should not contain more than 1,000 bacteria to the cubic centimeter. Classifying the wells of Baltimore according to the standard of less than 1,000 bacteria per cubic centimeter, and more than 1,000 bacteria per cubic centimeter, it was found that 30 wells rose above this figure, and 225 wells fell below this standard.\* The colon bacillus was found in 19 instances in the wells above 1,000, and 30 times in the wells under 1,000. The colon bacillus was present in 63 per cent.

\*The difference between these numbers and those mentioned above means that definite comparative chemical and bacteriological reports were not always made.

of wells over 1,000, and in only 13 per cent. under 1,000, showing that the colon bacillus was more frequently present in wells having high bacterial counts.

It is very difficult to establish an arbitrary standard for the number of bacteria in wells. Franklin has examined a large number of deep Kent wells sunk in chalk, and in 73 cases the lowest count was 5 and the highest count was 96. It can be stated that very good well water usually contains from 5 to 50 bacteria to the cubic centimeter, and that good well water contains from 50 to 500. Sedimentation also plays a considerable part, as a well may contain thousands of bacteria on the first pumping after a period of disuse, and after the well is pumped out the count may fall below 100 bacteria per c. c.

The presence of the colon bacillus should condemn a well at once, and the presence, after continuous pumping, of over 1,000 bacteria per c. c. should render the well suspicious.

During the past six years a large number of examinations have been made of the rivers and streams supplying the city, the various impounding reservoirs, and the tap water from various sections of the city. The analysis of the results will therefore be divided into three sections, corresponding to these distinct portions of the general supply.

#### EXAMINATION OF RIVERS AND STREAMS.

The number of bacteria present in one cubic centimeter of river water is subject to great variations, even in the same river, if the samples are taken from different portions of the river.

The work of Jordan shows that the entrance of large amounts of sewage from cities or towns into rivers will cause a great increase in the bacteria, but that as the river recedes from the point of pollution the bacteria decrease in numbers.

His work consisted in a large series of examinations of the Illinois river, which receives the main portion of the sewage of Chicago from the Chicago river. The Chicago river is connected with the Desplaines river by a large drainage canal, and this river empties into the Illinois river. He found from one to thirty-one million bacteria in the sewage in the canal, and as high as 237 parts of chlorine per million. When this became mixed with the Illinois river water, the bacteria varied from about 500,000 to 11,000,000, and the chlorine was from about 50 to 100 parts per million. When the river reaches Grafton, the self purification is marked. The chlorine varies from one to 18 parts per million, and the bacteria vary from 1,000 to 45,000. Grafton is about 300 miles below the point where the first entrance of sewage takes place.

The average number of bacteria in the sewage was 1,245,000, and the chlorine was 119.2. At Grafton the average of bacteria was only 10,200, and the chlorine 18.3. Many examinations were made at many points along the river; and a progressive diminution was found in the number of bacteria and the amount of chlorine present. The purest part of the river showed an average of 4,800 bacteria, and this might be taken as a fair standard for the majority of surface rivers running through inhabited water sheds.

On the other hand, Franklin gives some very low bacterial counts from rivers before they pass through inhabited country from which pollutions might be obtained.

The river Rhone, above Lyons, only contained 75 bacteria per c. c., and the Isar above Munich contained 531. Below Munich, just after receiving the sewage from the principal sewer of the town, the count arose to 227,000, and 16 miles below Munich the count fell to 2,378, showing the influence of self purification. The Lake of Zurich only contains from 100 to 200 bacteria per c. c., and all pure lakes correspond to this condition.

The problem in Baltimore at present does not present all of the difficulties which Jordan's investigation involved, since no very large volumes of sewage from towns or cities enter the streams and rivers supplying Baltimore with drinking water.

The pollutions might be described as scattered and equally distributed over the entire source of supply, and the results of the examinations seem to bear this out.

The rivers and streams have been examined 51 times, and in 28 samples the number of bacteria have been over 5,000 to the cubic centimeter. In 23 instances these samples were found to contain colon bacilli, and in 21 of these colon bacilli specimens the bacteria were over 5,000 bacteria to the c. c. Only 2 of these samples were under 5,000.

Twenty-eight of the samples taken from the rivers furnishing the source of supply were free from intestinal pollution, and 21 samples were under 5,000 bacteria to the cubic centimeter. Only 7 were over 5,000.

It will be seen that the colon bacillus is more frequently present in water containing more than 5,000 bacteria than in water under 5,000 per cubic centimeter.

#### EXAMINATIONS OF RESERVOIRS.

The water from the various reservoirs was examined 37 times. Intestinal pollution was demonstrated in 14 samples, and of these 7 were over 5,000 bacteria to the cubic centimeter, and 7 under this standard.

Twenty-three specimens were free from the colon bacillus, and 4 of these were over 5,000, while 19 were under this limit.

This shows that the infected samples contained more bacteria than the pure specimens, although the large amount of water in the reservoirs, and the small number of examinations renders these figures of small value.

Sedimentation in reservoirs doubtless causes a favorable change in the turbidity of any water, and if prolonged the amount of dissolved organic matter will also decrease. The Thames water as it entered the storage reservoir contained 1,991 bacteria, but after it had been stored for a month the bacteria were reduced to 368 per cubic centimeter. Later a more striking reduction took place when the bacteria were reduced from 1,437 to 177 by sedimentation.

#### EXAMINATION OF THE TAP WATER OF THE CITY.

The tap water was examined 92 times, and the bacteria were so seldom over 5,000 bacteria to the cubic centimeter that it was thought more instructive to place the standard of comparison between the bacterial contents and the presence of the colon bacillus at 1,000 bacteria to the c. c.

The intestinal or colon bacillus was found 26 times, and only 3 samples contained more than 1,000 bacteria to the c. c. It was absent in 66 specimens of water, and 13 specimens were over 1,000.

The percentage over the standard in the polluted waters was 13.90, while this percentage in the pure samples was 19 per cent. There is no great difference between these two sets of figures.

#### INFLUENCE OF SEDIMENTATION UPON NUMBER OF BACTERIA.

In 46 examinations of the rivers and streams, the number of bacteria per cubic centimeter amounted to 791,400 bacteria, or an average of 17,204 per sample. In 168 examinations from the City tap water the average of the bacteria per cubic centimeter was only 693. This difference is probably caused by the sedimentation which takes place in the reservoirs, as it is well known that sedimentation and storage will decrease the number of bacteria in drinking water.

In 36 examinations from the small streams supplying the City the count ran even higher. The average from 36 ex-

aminations was 17,666 per c. c., and these small streams probably contribute largely to the pollution and general increased bacterial count on the water shed.

COMPARISON BETWEEN THE BACTERIOLOGICAL AND THE CHEMICAL EXAMINATION OF THE DRINKING WATER.

In order to study the relation between the presence of increased numbers of bacteria and the presence of the colon bacillus, and the increase of the various chemical products of decomposition, a comparative study of the results of both sets of examinations has been made.

The standard for chlorine adopted by the department is 6 parts per million in pure drinking water. The free ammonia should not exceed .05 per million, and the nitrates should not exceed 5.0 parts per million. There should be no nitrites present.

In 149 pumps examined for a comparison between the chlorine and the bacteriological condition in which the chlorine was over 6 parts per million, the colon bacillus was found in 58 samples and was absent in 91 specimens. In these 149 pumps the bacteria were over 1,000 in 33 cases, and under 1,000 in 116 cases.

This seems to show that many wells having a chlorine higher than the standard are not to be condemned from a bacteriological standpoint, but these are only condemned chemically when the chemical products of decomposition are all excessive, or any one is decidedly in excess.

In 61 pumps containing the colon bacillus nitrites were present 21 times, and absent 40 times. In 9 samples of city tap water containing the colon bacillus, nitrites were present 6 times and absent 3 times. In 78 pumps containing the colon bacillus the chlorine was over 10 parts per million in 74 instances, and in 95 pumps in which the colon bacillus was not detected the chlorine was over this point 69 times. In



71 pumps in which the colon bacillus was present, the nitrates were over 5 parts per million in 34 cases. In 82 cases in which colon bacillus was absent, the nitrates were over 5 parts per million in 33 waters.

In 62 wells in which the colon bacillus was found, the free ammonia was over 0.05 per million in 29 cases, and under this figure in 33 cases. In 99 cases in which the colon bacillus was absent, the ammonia was over 0.05 in 34 tests, and under this in 65 samples.

In 156 samples of pumps the bacteriological and chemical examination agreed in calling the samples good in 44 instances and bad in 52 tests. The chemical examination was good and the bacteriological examination bad in 17 tests, and the chemical examination was bad and the bacteriological examination good 43 times.

These figures show that neither a chemical nor a bacteriological examination alone can be entirely relied upon to prove the purity of well or spring water. The bacteria are particulate bodies and may not always be present in the especial small amount of water examined. A negative bacterial test is not conclusive unless combined with a chemical test. The chemical materials are soluble, and increased amounts of the chemical products of decomposition are evenly distributed through liquids, and are always detected. The chemical examination of small bodies of water give the best comparative results. On the other hand, these figures show that certain wells may contain the colon bacillus and yet not show increased chemical products. These are in the minority, but if only a chemical examination were made, these polluted wells would escape detection.

The chemical examination of the general supply maintains such an even figure that no comparative chemical and bacteriological figures were attempted. Usually when nitrites are detected in the water the colon bacillus is also found.

The very interesting set of averages in the report of the chemist shows a remarkable increase in the chlorine and nitrates in the City wells, and demonstrate a thorough saturation of the soil with the products of putrefaction and decomposition from our medieval system.

#### EXAMINATION OF BACTERIAL SPECIES IN THE WATER SUPPLY.

A few special species have been isolated from the City tap water, and Table No. 2 gives the result in tabular form. The various fermentation organisms have been classified according to general types, and the number of times each type was isolated is given in the tables. This table shows the presence of the usual types of saprophytic water bacteria, but also demonstrates the presence of certain pathogenic bacteria, such as *Bacillus pyocyaneus*, *Bacillus proteus*, *Bacillus enteritidis* and *Bacillus coli communis*. A bacillus resembling *Bacillus typhosus* was obtained, but did not give the Widal reaction with typhoid blood. It appears in the tables as *Bacillus simultyphus*. The different types of fermentative bacteria, which must be differentiated from *Bacillus coli communis*, are also of interest.

TABLE No. 2.  
Showing Bacterial Species Isolated from the City Water.

SOURCE.	TAP WATER.	TAP WATER.	TAP WATER.
Name .....	Superficialis type.	B. Fluorescens.	Bacillus alkaligenes.
Morphology .....	Bacillus.	Short bacillus.	Short bacillus.
Gram's Stain .....	O	+	O
Motile .....	+	+	O
Spores .....	O	O	O
Appearance. Agar .....			
Dull. Wrinkled. Moist .....			
Same. Bouillon .....			
Scum. Turbid. Sediment .....			
Same. Potato .....			
Visible. Gas. Profuse .....			
Aerobic. Anaerobic .....			
Glucose. Fermentation .....			
Lactose. Fermentation .....			
Saccharose. Fermentation .....			
Grows at 37°C .....			
Liquefaction .....			
Gel. Casein. Serum .....			
Nitrate reduced .....			
Indol .....			
Milk. Reaction .....			
Coagulation .....			
Odor .....			
Chromogenesis .....			
Fluorescence .....			
Pathogenesis .....			
Remarks .....			

TABLE No. 2—Continued.

SOURCE.	TAP WATER.	TAP WATER.	TAP WATER.
Name .....	Bacillus mycoides.	Bacillus mesentericus	Bacillus annulatus.
Morphology .....	Long, thick bacillus.	vulgatus.	Short bacillus.
Gram's Stain .....	+	+	0
Motile .....	0	0	+
Spores .....	+	+	0
Appearance. Agar .....			
Dull. Wrinkled. Moist .....			
Same. Bouillon .....	Dull.	Wrinkled.	Moist.
Scum. Turbid. Sediment .....	Scum.	Scum, turbid.	Turbid.
Same. Potato .....			
Visible. Gas. Profuse .....	Profuse.	Wrinkled.	Profuse.
Aerobic. Anaerobic .....	Aer. Anaer.	Aer. Anaer.	Aer.
Glucose. Fermentation .....	0	0	0
Lactose. Fermentation .....	0	0	0
Saccharose. Fermentation .....	+	+	+
Grows at 37°C .....	+	+	+
Liquefaction .....			
Gel. Casein. Serum .....	G. C. S.	G. C. S.	G. C. S.
Nitrate reduced .....	+	+	+
Indol .....	0	+	+
Milk. Reaction .....	Neutral.	Neutral.	+
Coagulation .....	0	0	+
Odor .....	Stuffy.	Stuffy.	+
Chromogenesis .....	0	0	0
Fluorescence .....	0	0	0
Pathogenesis .....	0	0	0
	I. c. c. abd.	I. c. c. abd.	I. c. c. abd.
	cav. guinea pig.	cav. guinea pig.	cav. guinea pig.
Remarks .....	Isolated two times.	Isolated two times.	Isolated two times.

TABLE No. 2—Continued.  
Showing Bacterial Species Isolated from the City Water.

SOURCE.	TAP WATER.	TAP WATER.	TAP WATER.
Name.....	Bacillus pyocyaneus.	Bacillus simulyphus.	Spirillum saprophiles.
Morphology.....	Long, thin.	Short bacillus.	Spirillum.
Gram's Stain.....	0	0	0
Motile.....	+	+	+
Spores.....	0		0
Appearance. Agar.....			
Dull. Wrinkled. Moist.....	Moist.	Dull.	Moist.
Same. Bouillon.....			
Scum. Turbid. Sediment.....	Turbid.	Turbid.	Turbid, scum, alkaline.
Same. Potato.....		Scum.	
Visible. Gas. Profuse.....	Profuse.	Profuse, yellow.	Profuse, yellow.
Aerobic. Anaerobic.....	Aer. Anaer.	Aer. Anaer.	Aer. Anaer.
Glucose. Fermentation.....	50% Acid. CO <sub>2</sub> 1-H-2.	0	0
Lactose. Fermentation.....	Same.	0	0
Saccharose. Fermentation.....		0	0
Grows at 37° C.....	0	+	+
Liquefaction.....	+	0	0
Gel. Casein. Serum.....	(i. C. S.	0	+
Nitrate reduced.....	+	0	+
Indol.....	+	0	0
Milk. Reaction.....	Acid.	Acid.	Slightly acid.
Coagulation.....	+	0	0
Odor.....	Stuffy.	0	Fecal.
Chromogenesis.....		0	0
Fluorescence.....		0	0
Pathogenesis.....	1 c. c. general septicemia.	Widal reaction 1-50 typhoid blood negative.	1 c. c. g. pig. general septicemia.
Remarks.....	Abd. cav. guinea pig. Isolated 2 times.	Isolated 2 times.	

TABLE No. 2.—Continued.  
Showing Bacterial Species Isolated from the City Water.

SOURCE.	TAP WATER.	TAP WATER.	TAP WATER.
Name .....	Bacillus lactis aerogenes.	Bacillus proteus.	Bacillus cloacae.
Morphology .....	Short bacillus.	Long, thin.	Short bacillus.
Gram's Stain .....	O	O	O
Motile .....	O	+	+
Spores .....	O	O	O
Appearance. Agar .....	Moist.	Moist.	Moist.
Dull. Wrinkled. Moist .....	Alkaline.	Turbid.	Turbid, scum.
Same. Bouillon .....	Turbid.	Profuse.	Profuse.
Same. Potato .....	Profuse.	Aer. Anaer.	Aer. anaer.
Visible. Gas. Profuse .....	Aer. Anaer.	20% Acid CO <sub>2</sub> -I-H-2.	60-100% Acid CO <sub>2</sub> -2-H-I.
Aerobic. Anaerobic .....	85% acid. CO <sub>2</sub> -I-H-I.	O	O-10%.
Glucose. Fermentation .....	70% acid. CO <sub>2</sub> -2-H-I.	25% Acid CO <sub>2</sub> -I-H-2.	60-100% Acid CO <sub>2</sub> -2-H-I.
Lactose. Fermentation .....	90% acid. CO <sub>2</sub> -2-H-I.	+	+
Saccharose. Fermentation .....	+	+	+
Grows at 37° C. ....	O	G. C. S.	G. C. S.
Liquefaction ..	+	+	X (slight).
Gel. Casein. Serum .....	+	+	X (slight).
Nitrate reduced .....	+	+	O
Indol. ....	Acid.	Acid.	Acid.
Milk. Reaction .....	+	Fecal.	Fecal.
Coagulation .....	O	O	O
Odor .....	O	O	O
Chromogenesis .....	O	O	O
Fluorescence .....	O	+	+
Pathogenesis .....	1 c. abd. cav. guinea pig.	1 c. abd. cav. g. pig.	1 c. abd. cav. g. pig.
Pathogenesis .....	General septicemia.	General septicemia.	General septicemia.
Remarks .....	Isolated 10 times.	Isolated 4 times.	Isolated 4 times.

TABLE No. 2—Continued.

SOURCE.	TAP WATER.	TAP WATER.	TAP WATER.
Name.....	B. cloacae (nonliquefaciens.)	Bacillus gasoformans.	B. gasoformans (nonliquefaciens.
Morphology.....	Short bacillus.	Short bacillus.	Short bacillus.
Gram's Stain.....	0	+	0
Motile.....	+	+	+
Spores.....	0	0	0
Appearance, Agar.....	Dull.	Moist.	Moist.
Dull. Wrinkled. Moist.....			
Same. Bouillon.....	Turbid, scum.	Turbid.	Turbid.
Scum. Turbid. Sediment.....			
Same. Potato.....	Profuse.	Visible.	Visible.
Visible. Gas. Profuse.....	Aer. Anaer.	Aer. Anaer.	Aer. Anaer.
Aerobic. Anaerobic.....	60-80% Acid.	80% Acid. CO <sub>2</sub> -2-H-1.	60% Acid. CO <sub>2</sub> -1-H-2.
Glucose. Fermentation.....	0	100% Acid. CO <sub>2</sub> -1-H-1.	100% Acid. CO <sub>2</sub> -2-H-1.
Lactose. Fermentation.....	55-85% Acid. CO <sub>2</sub> -2-H-1.	65% Acid. CO <sub>2</sub> -1-H-1.	90% Acid. CO <sub>2</sub> -2-H-1.
Saccharose. Fermentation.....	+	+	+
Grows at 37°C. ....	0	+	0
Liquefaction.....			
Gel. Casein. Serum.....	0 (slight.)	Gelatin.	0
Nitrate reduced.....	0 (slight.)		0
Indol.....	0	Acid.	0
Milk. Reaction.....	Acid.		Acid.
Coagulation.....	0	0	0
Odor.....	Fecal.	Isolated 2 times.	Isolated 4 times.

TABLE No. 2—Continued.

SOURCE.	TAP WATER.	TAP WATER.	TOP WATER.
Name .....	Bacillus enteritidis.	Bacillus coli communis.	Bacillus Aureus.
Morphology .....	Short bacillus.	Short bacillus.	Short bacillus.
Gram's Stain .....	0	0	0
Motile .....	+	+	+
Spores .....	0	0	0
Appearance. Agar .....	Moist.	Moist.	Orange.
Dull. Wrinkled. Moist .....			
Same Bouillon .....			
Scum. Turbid. Sediment .....	Turbid.	Turbid.	Turbid.
Same. Potato .....	Visible.	Profuse.	Orange.
Visible. Gas. Profuse .....	Aer. Anaer.	Aer. Anaer.	Aer.
Aerobic. Anaerobic .....	40% Acid. CO <sub>2</sub> -1-H-2.	50% Acid.	0
Glucose. Fermentation .....	0 Alkaline	CO <sub>2</sub> -1-H-2.	0
Lactose. Fermentation .....	0 Alkaline	Same.	0
Saccharose. Fermentation .....	+	0 or 30% Acid. CO <sub>2</sub> -1-H-2.	0
Grows at 37°C .....	+	+	+
Liquefaction .....	0	0	+
Gel. Casein. Serum .....			G. C. S.
Nitrate reduced .....	+	+	+
Indol .....	Alkaline.	Acid.	Neutral.
Milk reaction .....	0	+	+
Coagulation .....	0	+	+
Odor .....	0	Fecal.	0
Chromogenesis .....	0	0	Orange.
Fluorescence .....	0	+	0
Pathogenesis .....	0	+	0
	Isolated two times.	1 c. c. often caused general septicemia by abd. infection in guinea pigs.	
Remarks .....	One type was fluorescent.	Isolated 26 times.	



TABLE NO. 2—Continued.

SOURCE.	TAP WATER.	TAP WATER.	TAP WATER.
Name.....	Bacillus erythrogenes.	Bacillus prodigiosus.	
Morphology.....	Short bacillus.	Short bacillus.	
Gram's Stain.....		0	
Motile.....	0	+	
Spores.....	0	0	
Appearance. Agar.....	Lemon yellow.	Red.	
Dull. Wrinkled. Moist.....			
Same. Rouillon.....			
Scum. Turbid. Sediment.....	Scum, turbid.	Scum, turbid.	
Same. Potato.....			
Visible. Gas. Profuse.....	Profuse.	Red.	
Aerobic. Anaerobic.....	Aer.	Aer. Anaer.	
Glucose. Fermentation.....	0	50% Acid. CO <sub>2</sub> -H <sub>2</sub> .	
Lactose. Fermentation.....	0	Same.	
Saccharose. Fermentation.....	0	Same.	
Grows at 37°C.....	+	+	
Liquefaction.....	+	+	
Gel. Casein. Serum.....	Gi. C. S.	Gi. C. S.	
Nitrate reduced.....	+	+	
Indol.....	+	+	
Milk. Reaction.....	Acid.	Acid.	
Coagulation.....	+	+	
Odor.....	0	+	
Chronogenesis.....	Lemon yellow.	Pungent.	
Fluorescence.....	0	Crimson red.	
Pathogenesis.....	0	0	
Remarks.....	0	0	

## GENERAL SUMMARY.

The first general conclusion which can be drawn from this six years' investigation of the Baltimore water supply only pertains to a small portion of the supply, namely, the wells. The large number of wells containing the colon bacillus, and the greatly increased quantities of the chemical products of decomposition show a general saturation of the sub-soil with the seepage from the cesspits, and proves the need of a general sewerage system.

The results of the bacterial counts and tests for the intestinal bacillus in the streams and rivers show the maximum pollution takes place in the small streams, and the gradual dilution and self-purification in the larger rivers and reservoirs removes a portion of the bacteria from the water before it gets to the city taps. The presence of colon bacilli in the tap water shows that intestinal material is still present, however, and there can be no doubt that a system of filtration would lessen the number of typhoid cases and other water-borne diseases.

Table No. 3, which follows, gives a detailed record of the examination of the water supply for the past six years, and is taken from the previous reports.

TABLE No. 3.

Complete Bacteriological Examinations of Water, 1897.

District, Stream or Well.	Date of Exami- nation.	Colonies per c. c.	Colon Bacillus present.	Condition.
Northwestern District	Jan. 8	193	None in 50 c. c.	
Northwestern District	" 14	231	" "	
Western District.....	" 16	216	" "	
Western District.....	" 20	159	" "	
Central District.....	Feb. 12	236	" "	
Central District.....	" 22	305	" "	
Lindsay Stream.....	" 26	240,000	Present in 0.5 c. c.	Bad.
Dophler Stream.....	Mar. 1	6,456	None in 0.5 c. c.	Bad.
Shipley Stream.....	" 6	16,950	" "	Bad.
Clinton Jessups Str'm	" 8	2,650	None in 50 c. c.	
Herman Horner Str'm	" 13	17,648	Present in 0.5 c. c.	Bad.
Pot Spring Stream...	" 15	158,000	" "	Bad.
Towson Run.....	" 24	.....	" "	Bad.
Warren Stream.....	" 30	7,421	" "	Bad.
Central District.....	May 5	409	None in 50 c. c.	
Central District.....	" 10	240	Present in 50 c. c.	
Well, Roland Park..	" 17	5,641	*Present in 0.5 c. c.	Bad.
Central District.....	" 17	218	None in 50 c. c.	
Plummer Well.....	" 27	8,640	Present in 0.5 c. c.	Bad.
Central District.....	June 9	630	None in 50 c. c.	
Well, Stansbury.....	" 24	370	" "	
Central District.....	" 29	45	" "	
Central District.....	July 9	362	" "	
Southeastern District.	" 14	196	" "	
Central District.....	" 19	450	" "	
Well, Chesterwood...	" 24	740	Present in 0.5 c. c.	Bad.
Well, Foley.....	" 28	14,400	None found in 0.5 c. c.	
Central District.....	Aug. 4	237	" " 50 "	
Southeastern District.	" 16	413	" " " "	
Central District.....	" 21	420	" " " "	
Penwood Park.....	" 28	95	" " 0.5 "	
Well, North'n District	Sept. 2	20	" " " "	
Well, Saw Mill.....	" 2	97	" " " "	
Well, Penwood.....	" 2	1,409	" " " "	Bad.
Northern District....	" 15	274	" " 50 "	
Central District.....	Oct. 10	198	" " " "	
Central District.....	" 26	186	" " " "	
Central District.....	" 29	195	" " " "	
Draayer Spring 1....	Nov. 4	.....	Present in 0.5 c. c.	Bad.
Draayer Spring 2....	" 4	.....	" "	Bad.
Harris Well.....	" 4	.....	" "	Bad.
League Well.....	" 4	.....	None in 50 c. c.	
Central District.....	" 16	282	" "	
Pump Calverton.....	" 24	.....	Present in 5 c. c.	Bad.
Central District.....	" 15	287	None in 50 c. c.	
Well A.....	Dec. 10	546	Present in 1 c. c.	Bad.

\*The bacillus prodigiosus and pyocyaneus were also present in 0.5 c. c.

TABLE No. 3.

Complete Bacteriological Examinations of Water, 1898.

Tap, Stream or Well.	Date of Exami- nation.	Colonies per c. c.	Colon Bacillus. Present.	Condition.
City Tap .....	Feb. 24	205	None in 50 c. c.	Good.
Stream at Lutherville emptying into City supply.....	Mar. 7	81,020	Present in 1 c. c.	Bad.
Kennedy stream City supply.....	" 7	6,347	None in 1 c. c.	"
Lake Roland, surface of lake.....	" 8	258	None in 5 c. c.	Good.
Lake Roland, 30 feet under surface.....	" 8	347	" "	"
Phoenix Dam, surface	" 17	284	" "	"
Phoenix Dam, 18 feet below surface.....	" 17	557	" "	"
Ashland Dam, surface	" 17	1,528	" "	"
Ashland Dam, 15 feet below surface.....	" 17	660	" "	"
Mouth of Gunpowder River, surface.....	Apr. 10	24,726	" "	Suspicious.
Mouth of Gunpowder River, 18 feet below surface.....	" 10	880	" "	Good.
City tap.....	" 11	280	Present in 50 c. c.	Bad.
Surface, Lake Monti- bello.....	May 5	784	None in 1 c. c.	Good.
Lake Montibello, 18 feet below.....	" 5	1,144	" "	"
Warren Dam, surface	" 13	.....	Present in 50 c. c.	Bad.
Warren Dam, 18 feet below surface.....	" 13	15,195	" "	"
Great Gunpowder River, below York road bridge, after oneweek'shardrain	" 13	48,240	Present in 5 c. c.	"
Towson Run, on Swelt's property...	" 21	.....	Present in $\frac{1}{4}$ c. c.	"
Towson Run, rear of Consolidated Rail- road Co.....	" 21	.....	Present in 5 c. c.	"
City Tap.....	June 1	106	None in 50 c. c.	Good.
Head of Lake Roland	" 8	2,040	" "	"
Lake Roland(Hollins)	" 8	2,730	Present in 5 c. c.	Bad.
Towson Branch Lake Station.....	" 8	1,551	None in 5 c. c.	Good.
Peterson Run, below Christy property...	" 10	1,248	Present in $\frac{1}{4}$ c. c.	Bad.

TABLE No. 3.

Complete Bacteriological Examinations of Water, 1898.

Tap, Stream or Well.	Date of Examination.	Colonies per c. c.	Colon Bacillus Present.	Condition.
East branch of same..	June 10	1,016	Present in $\frac{1}{4}$ c. c.	Bad.
Cromwell Run.....	" 18	1,568	None in 5 c. c.	Good.
Minebank Run, on Treadwell property.	" 18	3,685	" "	Suspicious.
Towson Run, on Long-necker's property...	" 10	6,448	" "	"
Hampden Run, on Ridgely property...	" 10	12,408	" "	"
Towson Run, on Sheppard Asylum property.....	" 18	6,900	Present in $\frac{1}{4}$ c. c.	Bad.
Towson Run, on Mayer property.....	" 18	1,088	None in 5 c. c.	Good.
Southwest Branch of Towson Run, on Sheppard Asylum property.....	" 18	10,368	" "	Bad.
Northwest Branch of Towson Run, on Baldwin property...	" 18	2,976	" "	Fair.
Towson Run, on Enoch Pratt property.....	" 18	2,193	" "	"
Orebank Run.....	" 24	.....	" "	"
Ridgely Run.....	" 24	.....	Present in $\frac{1}{4}$ c. c.	Bad.
Sherwood Run, on N. C. R. R. property...	July 1	5,206	None in 5 c. c.	Suspicious.
East Roland Run, on Golbert property...	" 1	1,320	" "	Good.
Roland Run, on Gurner property.....	" 1	7,860	Present in $\frac{1}{4}$ c. c.	Bad.
Roland Run, below Ruxton.....	" 1	15	None in 5 c. c.	Good.
North Roland Run, on Cockey property...	" 1	2,070	" "	Fair.
Roland Run, on Mrs. M. Gobbert's property.....	" 1	750	Present in $\frac{1}{4}$ c. c.	Bad.
Gurner's Branch of Roland Run.....	" 1	7,409	" "	"
Cockey's Run, at Cockeysville.....	" 16	9,872	" "	"
Beaver Dam Run, at Cockeysville.....	" 16	3,360	B. Pyocyaneus in $\frac{1}{4}$ c. c.	"
Beaver Dam Run, at Marble Works.....	" 16	25,952	Present in $\frac{1}{4}$ c. c.	"

TABLE No. 3.  
Complete Bacteriological Examinations of Water, 1898.

Tap, Stream or Well.	Date of Exami- nation.	Colonies per c. c.	Colon Bacillus Present.	Condition.
Beaver Dam, at Ash- land .....	July 16	18,246	None in 5 c. c.	Bad.
Western Run, at Ash- land .....	" 16	4,064	Present in $\frac{1}{4}$ c. c.	"
Western Run Branch, of Beaver Dam.....	" 16	9,382	" "	"
Water below Scott Price property.....	Sept. 8	.....	None in 5 c. c.	Fair.
Water opposite Scott Price property.....	" 8	.....	Present in 5 c. c.	Bad.
Water above Scott Price property.....	" 8	.....	" "	"
Water above Yellott house.....	" 8	.....	None in 5 c. c.	Fair.
Water below Yellott house.....	" 8	.....	" "	"
Clinton Jessops.....	Oct. 5	.....	Present in 5 c. c.	Bad.
Yellott house.....	" 5	.....	" "	"
City Tap.....	Nov. 21	281	None in 50 c. c.	Good.
" ".....	Dec. 12	203	" 100 "	"
" ".....	" 31	128	" 500 "	"

TABLE No. 3—1899.

Tap, Steam or Well.	Laboratory No.	Date of Examination.	Colonies per c. c.	Colon Bacillus present.	Condition.
Laboratory Tap .....	270	April 4	186	None in 1-50 c. cs.	Good.
Pump 1, Carroll Park .....	271	" 4	1,458	" 1 c. c.	Bad.
" 2, " .....	272	" 4	253	" "	Good.
" 3, " .....	273	" 4	10,080	Present in 1 c. c.	Very bad.
" in yard of 1116 Winchester street.....	274	" 22	942	" 5 c. cs.	Bad.
" " 2503 Eutaw Place .....	275	" 22	32	None in 1 or 7 c. cs.	Good.
" at 2338 Linden avenue .....	276	" 22	7	" "	Good.
" n. w. cor. Preston st. and Druid Hill av.	277	" 22	Out of use.	Condemned.	.....
" rear of 201 W. Monument street .....	278	" 25	63	None in 1 c. c.	Good.
" 204 Dolphin street .....	279	" 25	13	" "	Good.
" at 2652 Pennsylvania avenue .....	280	" 25	780	" "	Fair.
" 2858 Pennsylvania avenue .....	281	" 25	444	Present in 1 c. c.	Bad.
" Baker property, Liberty road and Baker street.....	282	May 10	.....	None in 5 or 50 c. cs.	Good.
" 2600 W. North avenue .....	283	" 10	Out of use.	Condemned.	.....
" cor. Thomas and North avenue .....	284	" 10	.....	None in 5 or 50 c. cs.	Good.
" on Second street near North avenue ..	285	" 10	Out of use.	Condemned.	.....
" 2810 W. Lanvale street .....	286	" 12	" "	" "	.....
" 2826 Lanvale street .....	287	" 12	600	None in 50 c. cs.	Fair.
" 2847 " .....	288	" 12	Out of use.	Condemned.	.....
" 2466 Druid Hill avenue .....	289	" 12	" "	" "	.....
" 2470 " .....	290	" 12	" "	" "	.....
" H. J. Waters, Liberty rd. and tollgate ..	291	" 20	708	None in 1 or 50 c. cs.	(good.
" Geo. Long, Liberty road and tollgate ..	292	" 20	180	" "	Good.
" H. Kinstler, Liberty road, near tollgate ..	293	" 20	118	" "	Good.
" Jas. Doyle, " .....	294	" 20	990	" "	Good.
" P. Donohue, Liberty road, near Sling-luff avenue .....	295	" 20	372	Present in 1 c. c.	Bad.

	June	5	13,500	Present in 1 c. c.	Bad.
Pump, C. Keppler, Slingluff avenue, near Liberty road .....	296				
" P. Donohue, Slingluff avenue, near Liberty road .....	297	"	2,070	"	Bad.
" Mr. Albert, Slingluff avenue near Liberty road .....	298	"	93	"	Bad.
" H. J. Waters, Slingluff avenue, near Liberty road .....	299	"	324	"	Bad.
" J. Woods, Slingluff near North avenue .....	300	"	pump dry, out of use 1,560	Present in 1 c. c.	Bad.
" G. Long, Slingluff near North avenue .....	301	"			
" Windsor avenue and Eleventh street, "Highlands" .....	302	"	100	None in 1 c. c.	Good.
" Chas. Shipley, Liberty road and Beach avenue .....	303	"	29	"	Good.
" Chas. Shipley, Beach avenue, near Liberty road .....	304	"	213	"	Good.
" Mrs. Brausnell, Tenth street, near Beach avenue .....	305	"	20	"	Good.
" Epiphany Cottage, Beach avenue, near Eighth street .....	306	"	84	"	Good.
" 2517 Pennsylvania avenue .....	307	"	262	" 50 c. c.	Fair.
" 2851 " " .....	308	"	24	"	Fair.
" 2659 " " .....	309	"	21	"	Fair.
" cor. Pennsylvania ave. and Clifton st. City, at Laboratory tap .....	310	"	11	"	Fair.
" 1577 Clifton street .....	311	"	100	"	Fair.
Water from Bull mansion .....	312	"	145	None in 1-50 c. cs.	Good.
Pump, Pulaski street, near Liberty road .....	313	"	318	" 1 c. c.	Good.
" Pennsylvania and Fulton avenues .....	314	"	65	"	Good.
" 201 Bloomingdale avenue .....	315	"	15	"	Suspicious.
" 761 Bloomingdale road .....	316	"	200	"	Good.
" Butcher's lane, between Pennsylvania and North avenues .....	317	"	7,420	"	Bad.
" Mr. Albert, Slingluff avenue, near Liberty road .....	318	"	58	"	Good.
	319	July	6	Present in 1 c. c.	Bad.
			474		



TABLE No. 3—1899.

Tap, Stream or Well.	Laboratory No.	Date of Examination.	Colonies per c. c.	Colon Bacillus present.	Condition.
Pump, H. J. Walters, Shingluff avenue, near Liberty road .....	320	July 6	162	Present in 1 c. c.	Bad.
" St Peter's cemetery .....	321	" 6	190	None in 50 c. cs.	Good.
" Hamilton Easter's estate, Liberty rd. ....	322	" 6	30	Present in 50 c. cs.	Bad.
" Mr. Ridgely, Liberty road .....	323	" 6	91	"	Bad.
" 2858 Pennsylvania avenue .....	324	" 27	268	" 1 c. c.	Bad.
" 2854 " .....	325	" 27	18	None in 1 or 5 c. c.	Good.
" "Elgin," Elgin avenue .....	326	" 27	1,326	Present in 5 c. c.	Bad.
Spring, "Elgin," Elgin avenue .....	327	" 27	2,160	None in 1 or 5 c. c.	Bad.
Pump, Mr. Dennis, Elgin avenue .....	328	" 27	58	" 1 c. c.	Good.
Well, Ridgewood and Grenada avenues, Mr. Reid, Mt. Washington .....	329	" 27	44	Present in c. c.	Bad.
Spring, Edmondson ave., nr. Potomac R. R. ....	330	" 27	53	None in 1-50 c. c.	Good.
Pump, Hermitage, Gardiner House .....	331	August 11	See Chem. Report	"	"
Spring, Hermitage, Mansion House .....	332	" 11	See Chem. Report	"	"
" "Evergreen" .....	333	" 11	See Chem. Report	"	"
Pump, Poplar Hill .....	334	" 11	See Chem. Report	"	"
Spring, 2715 W. North ave., H. T. Halstead	335	" 11	30	None in 1 or 50 c. c.	Good.
Thos. Weeks, residence .....	336	" 11	113	"	Good.
G. G. Armour, Ridgewood avenue .....	337	" 11	3	Present in 50 c. c.	Bad.
W. H. Diftenderfer, residence, (Office, U. R. Co.) .....	338	" 11	9,360	None in 1 or 50 c. c.	Bad.
Stand Pipe, West Arlington .....	339	" 11	4,800	Present in 50 c. c.	Bad.
Hydrant water, 280 W. Baltimore street ..	340	" 19	See Chem. Report	"	"
Stand Pipe, Arlington Tap .....	341	" 19	3,900	Present in 1 c. c.	Bad.
Western Pump House, into Druid Hill Tap, to stand pipe .....	342	" 19	165	None in 1-50 c. c.	Good.
High Service, Druid Hill Park .....	343	" 19	222	None in 1 or 50 c. c.	Good.

Druid Hill Lake, taken from lake.....	344	August 19	414	Present in 50 c. c.	Bad.
Stand Pipe, bottom.....	345	" 19	117	None in 1 or 50 c. c.	Good.
Towson Branch, Lake Roland.....	346	" 19	931	Present in 50 c. c.	Bad.
Jones' Falls, Green Spring Bridge.....	347	" 19	298	" "	Bad.
Pump house, Lake Roland.....	348	" 19	1,740	" 1 c. c.	Bad.
Branch from Lakeside, Lake Roland.....	349	" 19	3,660	None in 1 c. c.	Bad.
Waste from conduit, Gate House, Lake Roland.....	350	" 19	20,400	Present in 50 c. c.	Bad.
Middle of Lake Roland, 100 yards from the dredge.....	351	" 19	3,180	None in 1-50 c. c.	Bad.
Cottage avenue, Warfield.....	352	See Chem. Report			
Pump, 722 York road.....	353	August 29	114	None in 1 or 50 c. c.	Good.
" 3210 Cedar avenue.....	354	Sept. 5	2,460	Present in 1 c. c.	Bad.
" 3441 Chestnut avenue.....	355	" 14	34	None in 1 or 50 c. c.	Good.
City water, laboratory tap.....	356	" 14	738	None in 1 or 50 c. cs.	Good.
Pump, First Toll Gate, Liberty road.....	357	" 25	83	None in 1 c. c.	Good.
" T. J. Brown, Ninth and Pressbury streets.....	358	October 31	396	Present in 50 c. c.	Bad.
Pump, Mrs. Jas. Carey, Clifton ave. ext.....	359	" 31	4,320	" "	Bad.
" Francis White, North avenue and Twelfth street.....	360	" 81	322	None in 50 c. c.	Good.
Hydrant tap, 1223 E. North avenue.....	361	" 31	288	Present in 50 c. c.	Suspicious.
" " Park avenue.....	362	Nov. 29	see Chem. Report		
Pump, Mr. Fox, Riggs avenue.....	363	" 29	282	Present in 50 c. cs.	Bad.
" Mr. J. Doyle, Riggs avenue.....	364	" 29	894	" "	Bad.
" Chas. Hoffman, Riggs avenue.....	365	" 29	124	None in 50 c. cs.	Good.
" Jas. Cross, Riggs avenue.....	366	" 29	198	Present in 50 c. cs.	Bad.
" Bruce Hoffman, Riggs avenue.....	367	" 29	104	See Chem. Report.	
" Wm. E. Turner.....	368	" 29	82	None in 50 c. cs.	Good.
City water, laboratory tap.....	369	Dec. 5	796	Present in 50 c. c.	Bad.
	370				

TABLE No. 3—1900.

Tap, Steam or Well.	Laboratory No.	Date of Examination.	Colonies per c. c.	Colon Bacillus present.	Condition.
City Water—Southwestern District .....	371	Jan.	246	None in 1 or 50 c.cs.	Good.
Laboratory tap .....	372	"	304	"	Good.
Southern Police District .....	373	"	336	"	Good.
Western District .....	374	"	209	None in 1 c. c.	Good.
Central Annex District .....	375	"	159	None in 1 or 50 c.cs.	Good.
Central District, laboratory tap .....	376	Feb.	222	Present in 50 c. cs.	Good.
Eastern District .....	377	"	378	Present in 1 c. c.	Bad.
Northeastern District .....	378	"	335	None in 1 or 50 c.cs.	Good.
Northwestern District .....	379	"	439	Suspicious in 50 c.cs.	Suspicious.
Southwestern District .....	380	"	1,908	None in 1 or 50 c.cs.	Suspicious, as bacteria are rather high.
Pumps—2508 Mosher street extended .....	381	Mar.	618	None in 1 or 5 c. cs.	Fair.
2516-18 Mosher street extended .....	382	"	954	Present in 5 c. cs.	Bad.
2534 Mosher street extended .....	383	"	828	None in 1 or 5 c. cs.	Suspicious.
Mrs. Ray, Riggs avenue extended .....	384	"	366	"	Good.
Mrs. Flanagan, Riggs avenue extended .....	385	"	444	"	Good.
1007 Second street, Northwest Annex .....	386	"	822	"	Fair.
2402 Riggs avenue .....	388	"	31	Present in 50 c. cs.	Bad.
2542 Mosher street extended .....	389	"	300	None in 1 or 50 c.cs.	(good.)

Mrs. L. B. Pernel, Third street extended	390	Mar.	31	.....	Present in 50 c. cs.	Bad.
5 Third avenue extended	391	"	31	.....	Present in 1 c.	Bad.
13 Third avenue extended	392	"	31	.....	.....	Can't classify.
1104 Third avenue extended	393	"	31	.....	.....	Can't classify.
2800 Lafayette avenue	394	"	31	184	Present in 50 c. cs.	Bad.
1022 Bloomingdale road	395	"	31	510	Suspicious in 50 c. cs	Suspicious.
Mrs. L. B. Purnell, Bloomingdale road	396	"	31	315	.....	Fair.
Q. L. Berry, Bloomingdale road	397	"	31	510	None in 1 or 50 c. cs.	Fair.
S. L. Brayshaw, Franklin road	398	April	25	185	"	Good.
Wm. Williamson, Franklin road	399	"	25	40	"	Good.
E. B. Tyler, Franklin road	400	"	25	726	"	Fair.
H. Gerkins, Franklin road	401	"	25	4,660	"	Bad.
James Cross, Riggs avenue extended	402	"	27	11,590	Present in 1 c. c.	Very bad.
2508 Mosher street	403	"	27	224	None in 1 or 50 c. cs.	Good.
2534 Mosher street	404	"	27	3,060	Present in 1 c. c.	Bad.
C. Flanigan, Riggs avenue extended	405	"	27	239	.....	Good.
2542 Mosher street	406	"	27	732	None in 1 or 50 c. cs.	Suspicious.
Ninth and Pressbury streets	407	May	7	5,760	"	Bad.
1022 Bloomingdale road	408	"	7	648	"	Fair.
Mrs. J. Carey, Clifton avenue extended	409	"	7	7,620	Present in 50 c. cs.	Bad.
Francis White, North avenue extended	410	"	7	135	"	Bad.
John Nixon, Franklin Valley Farm, Franklin road	411	"	18	1,050	None in 1 or 50 c. cs.	Bad.
849 Franklin road	412	"	18	300	"	Fair.
James Bueby, Franklin road	413	"	18	570	"	Fair.
Mrs. Jane McCormick, Franklin road	414	"	18	600	"	Fair.
812 Franklin road	415	"	18	180	.....	Bad.
Mrs. Purnell	416	"	—	732	None in 1 or 5 c. cs.	Suspicious.
G. W. Sharretts, Easter lane	417	June	5	606	Present in 50 c. cs.	Bad.
John Lutz, Easter lane	418	"	5	288	"	Bad.
Wm. Workinger, Liberty road	419	"	5	126	None in 1 or 50 c. cs.	Suspicious.
Edwin Quick, Liberty road	420	"	5	2,700	"	Bad.
Pumps - Mitchell, Liberty road	421	"	5	22	None in 1 or 50 c. cs.	Good.
2800 block, Lafayette avenue	422	"	5	52	Present in 50 c. cs.	Bad.
Well—Quarantine	423	"	19	274	None in 1 or 50 c. cs.	Good.

TABLE No. 3—1900.

Tap, Stream or Well.	Laboratory No.	Date of Examination.	Colonies per c. c.	Colon Bacillus present.	Condition.
Spring—Quarantine	424	June 19	37	None in 1 or 50 c.cs.	Good.
Pump—Harry Hartman, Eastern lane	425	" 19	216	" "	Good.
A. Abraham, Eastern lane	426	" 19	288	" "	Good.
City Water—Laboratory tap	427	" 13	284	Present in 1 c. c.	Bad.
Laboratory tap	428	" 19	282	None in 1 c. c.	Fair.
Pump No. 1—Mrs. Purnell	429	" "	120	None in 1 or 50 c.cs.	Good.
No. 2—Mrs. Purnell	430	" 22	96	Present in 50 c. cs.	Bad.
City Water—Laboratory tap	431	July 5	326	None in 1 or 50 c.cs.	Bad.
Well—John Veise, Reisterstown	432	" 16	900	Present in 1 c. c.	Bad.
Pump—Brent Reed, Reisterstown road	433	" 16	690	None in 1 or 50 c.cs.	Good.
John Schaefer, Reisterstown road	434	" 16	48	None in 1 c. c.	Good.
Philip Fix, Reisterstown road	435	" 16	88	Present in 1 c. c.	Bad.
Rachel Disney, Reisterstown road	436	" 16	1,440	None in 1 c. c.	Suspicious.
James Carey, Clifton avenue	437	" 19	84	None in 1 or 50 c.cs.	Good.
Pennhurst and Edward aves, W. Arlington	438	" 19	774	" "	Good.
2852 Pennsylvania avenue	439	" 28	216	None in 1 c. c.	Good.
M. Murphy, Irvington	440	" 21	1,470	" "	Bad.
H. Odenwall, Irvington	441	" 21	1,041	" "	Bad.
Spring—Huper's, Irvington	443	" 21	8,100	" "	Bad.
Artesian Well—13 South Frederick street	444	" 24	65	None in 1 c. c.	Suspicious.
Well—J. E. Tippet, Garrison	446	" 24	294	Present in 1 c. c.	Bad.
City Water—Laboratory tap	447	Aug. —	831	" "	Bad.
Pump—H. Phillip, Hillen road, No. 1	448	" —	1,560	None in 1 c. c.	Suspicious.

Pump—H. Phillip, Hillen road, No. 2.....	449	Aug.	—	1,740	None in 1 c.	Suspicious.
Mrs. Rainey, 121 Brady avenue.....	450	"	—	2,560	Present in 1 c. c....	Bad.
J. B. Yeagle, North Walbrook.....	451	"	—	804	"	Bad.
Gwynn Oak House, Gwynn Oak.....	452	Sept.	10	1,620	Present in 1 or 50 c. cs.	Bad.
City Water—Laboratory tap.....	453	"	10	150	None in 1 c. c....	Good.
Pump—(House) H. T. Campbell, Harford road....	454	"	10	260	"	Good.
(Stable) H. T. Campbell, Harford road ..	455	"	10	134	"	Good.
Well—Quarantine, No. 1.....	456	Oct.	12	16	Present in 50 c. c....	Suspicious.
Quarantine, No. 2.....	457	"	12	128	None in 1 or 50 c. cs.	Good.
City Water—Laboratory tap.....	458	"	3	390	Present in 1 or 50 c. cs.	Bad.
Pump—E. C. Bosworth, Hoffman lane, Carroll Sta.	459	Nov.	17	3,510	Present in 1 c. c....	Bad.

TABLE No. 3.—1901.

TAP, STREAM OR WELL.	DATE.	COLONIES PER C.C.		COLON BACILLUS.	CONDITION.
		Aerobic.	Anaerobic.		
Pump—Richard Beeler, Shirley lane and Reisterstown road.....	April 6	1,170	.....	Present in 50 c. c.	Bad.
Wm. Breckenridge, Shirley lane.....	" 6	573	.....	Present in 1 and 50 c. c.	Bad.
G. W. Gail, Pimlico road.....	" 6	870	.....	Present in 50 c. c.	Bad.
Daniel H. Whitney, Shirley lane.....	" 6	6,900	.....	Not present in 1 and 50 c. c.	Bad. Too many bacilli.
Wm. Ludwig, Shirley lane.....	" 6	594	.....	" "	Fair.
E. C. Bosworth, Hoffman lane.....	" 12	1,440	.....	Present in 50 c. c.	Bad.
Well—Quarantine.....	May 5	26,700	.....	Not present in 1 and 50 c. c.	Bad.
Pump—J. S. Spence, 1022 Bloomingdale road.	" 25	6,300	.....	Present in 1 and 50 c. c.	Very bad.
City Water—Laboratory tap.....	June 18	2,724	Not estimated	Not present.	Bad.
Pump—Mr. Yearley.....	" 16	Not estimated	.....	Not present in 1 c. c.	.....
City Water—Laboratory tap.....	" 8	188	26	.....	.....
Pump—Lydecker's.....	July 11	18	.....	Not present in 1 and 50 c. c.	Good.
Dietrick's.....	" 11	7	.....	" "	Good.
Owens Distillery.....	" 11	217	.....	" "	Good.
Catonsville Water—Dr. Hahn, Irvington.....	" 11	238	.....	Present in 1 and 50 c. c.	Bad.
Pump—Leary Miller's.....	" 11	930	.....	Present in 1 c. c.	Bad.
Dr. Hollyday, Frederick avenue.....	" 11	84	.....	Not present in 1 and 50 c. c.	Good.
Front of 1422 Block street.....	" 29	45	.....	" "	.....
Front of 1518 Thames street.....	" 29	248	.....	" "	.....

City Water—First ward .....	Sept. 3	2,820	122	Present in 50 c. c.	Bad.
Second ward .....	" 3	164	62	Not present in 1 and 50 c. c.	Suspicious.
Third ward .....	" 3	160	168	" "	Suspicious.
Fourth ward .....	" 3	678	210	" "	Good.
Fifth ward .....	" 3	243	198	" "	"
Sixth ward .....	" 3	78	83	" "	Suspicious.
Seventh ward .....	" 24	336	68	Present in 1 c. c.	Suspicious.
Eighth ward .....	" 24	348	53	Present in 1 and 50 c. c.	Bad.
Ninth ward .....	" 24	252	29	Present in 50 c. c.	Bad.
Tenth ward .....	" 24	426	36	" "	Bad.
Eleventh ward .....	" 24	228	28	Present in 1 c. c.	Bad.
Twelfth ward .....	" 24	204	74	Present in 1 and 50 c. c.	Bad.
Fourteenth ward .....	Oct. 22	57	63	Not present in 1 and 50 c. c.	Good.
Sixteenth ward .....	" 22	69	29	" "	Good.
Eighteenth ward .....	" 22	93	95	" "	Good.
Nineteenth ward .....	" 22	104	85	Present in 50 c. c.	Bad.
Stream—Light street bridge (at foot of bridge).	Dec. 13	.....	.....	Not present in 1 and 50 c. c.	.....
Light street bridge (at foot of bridge).	" 13	.....	.....	Present in 50 c. c.	Bad.
Fort McHenry (at water front)	" 13	.....	.....	Present in 1 and 50 c. c.	Bad.
Fort McHenry (60 ft. from water front)	" 13	.....	.....	Present 50 c. c.	Bad.
Public baths (at water front).	" 13	.....	.....	Not present in 1 and 50 c. c.	.....
Public baths (60 ft. from water front)	" 13	.....	.....	Present in 1 and 50 c. c.	Bad.



## EXAMINATION OF SEWAGE.

Many examinations of the stream called Jones' Falls, containing a large portion of the city sewage, have been made. This stream runs through the centre of the city and empties into the basin. The colon bacillus is always present, and the bacteria vary from 500,000 to 1,000,000 per cubic centimeter (15 drops.)

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REPORT ON THE BACTERIOLOGICAL EXAMINATION OF MILK  
DURING THE YEAR 1902.

The following report is based upon a series of examinations made by Mr. E. H. Schorer, under the supervision of the City Chemist and Bacteriologist.

*Examination of the Milk as Received at the Various  
Railroad Stations.*

The first series of examinations was made from the milk as it is received in the cans at Fulton station of the Western Maryland Railroad Company.

Eight samples were examined with the following averages:

Lactometer reading, 102; specific gravity, 1.0305; fat, 6.6 per cent.; acidity, 2.3 per cent.; formaldehyde, 1 in 8 samples; bacterial count, 1 per cent., acid agar, 2,288,700; Neutral agar, 2,175,200.

The next series of examinations were made from the Maryland and Pennsylvania R. R. Station, 10 samples were examined: Lactometer reading, 102; specific gravity, 1.0305; fat, 5.32 per cent.; acidity, 2.131; formaldehyde, 3 in 10; bacterial count, 1 per cent.; acid agar, 1,441,600; neutral agar, 1,181,800.

The next set of samples were taken from Calvert Station of the Pennsylvania R. R.; 10 samples examined. Lactometer reading, 102; specific gravity, 1.0302; fat, 5.47 per cent.; acidity, 1.99; formaldehyde, 3 in 10; bacterial count, 1 per cent.; acid agar, 1,688,700; neutral agar, 1,686,700.

Hillen Station of the Western Maryland R. R., 11 samples examined: Lactometer reading, 102; specific gravity, 1.0305; fat., 5.88 per cent.; acidity, 2.22; formaldehyde, 1 in 11; bacterial count, 1 per cent.; acid agar, 1,390,550; neutral agar., 1,294,220.

President Street Station of the Pennsylvania R. R., 10 samples examined: Lactometer reading, 101.6; specific gravity, 1.0300; fat, 6.93 per cent.; acidity, 2.0; formaldehyde, 0 in 10 samples; bacterial count acid agar., 2,246,000; neutral agar., 2,881,230.

Camden Station of the Baltimore and Ohio R. R., 11 samples examined: Lactometer reading, 101.3; specific gravity, 1.0298; fat, 5.46 per cent.; acidity, 2.15; formaldehyde, 2 in 11; bacterial count, acid agar., 1,504,200; neutral agar, 1,128,800.

In all, 60 samples were examined, and the total results were as follows: Lactometer reading, 102; specific gravity, 1.0306; fat, 5.82 per cent.; acidity, 2.05; formaldehyde, 9 in 60; bacterial count, acid agar, 1,767,916; neutral agar, 1,711,293.

#### *Examination of the Wagons on the Streets of the City.*

Another series of examinations were made of the milk obtained from the wagons serving milk to the various districts, and many of these samples were of milk obtained at the stations on the previous afternoon.

Northwestern district, 10 samples examined: Lactometer reading, 101; specific gravity, 1.0300; fat, 3.98 per cent.; acidity, 2.24; formaldehyde, 5 in 10; Milk of day before, 6 in 10; bacteria acid agar, 1,288,400; neutral, 937,333.

Northwestern district, 11 samples: Lactometer reading, 100.8; specific gravity, 1.0296; fat, 4.21 per cent.; acidity, 2.45; formalhyde, 6 in 11; milk of day before, 10 in 11; bacteria, acid agar, 4,067,633; neutral agar, 1,360,000.

Northeastern district, 10 samples; lactometer reading, 100.8; specific gravity, 1.0298; fat, 3.94 per cent.; acidity, 2.8; milk of the day before, 9 in 10; formaldehyde, 7 in 10; bacteria, acid agar, 5,070,600; neutral agar., —.

Northeastern district, 7 samples; lactometer reading, 103; specific gravity, 1.0310; fat, 4.4 per cent.; acidity, 2.4; formaldehyde, 5 in 7; milk of day before, 6 in 7; bacteria, acid agar 5,353,333.

Southeastern district, 11 samples; lactometer reading, 100.2; specific gravity, 1.0295; fat, 3.74 per cent.; acidity, 2.1; formaldehyde, 5 in 11; milk of day before, 9 in 11; bacteria, acid agar 4,924,200.

Grand total of milk from wagons, 49 samples; lactometer reading, 101; specific gravity, 1.0300; fat, 4.12 per cent.; acidity, 2.27; formaldehyde, 28 in 49; milk of day before, 40 in 49; bacteria, acid agar, 4,038,191; neutral agar, (10 samples, 979,900).

#### SUMMARY OF AVERAGES OF CITY INSPECTIONS.

	Stations.	Wagons.	Stores.	Condenned Milk.
Specific gravity.....	1.0305	1.0800	1.0290	1.0268
Lactometer .....	102	101	100	97.8
Fat .....	5.82%	4.12%	3.5%	3.23
Acidity .....	2.05	2.27	2.29	1.5
Formaldehyde.....	15%	57.1%	50%	43%
Acid agar. (bacterial) .	1,767,916	4,083,191	3,000,500	8,755,000
Neutral agar.....	1,711,293	.....	5,161,600	7,052,375

*The Examination of Milk in Small Stores.*

Eight samples of milk were examined from stores in the vicinity of Hillen Station. The following was the result:

Lactometer reading, 100.1; specific gravity, 1.0295; fat, 4.64 per cent.; acidity, 2.28; formaldehyde, 4 in 8 samples; bacterial count, neutral agar, 5,161,600.

Sixty samples from stores throughout the city were examined at a later period, with the following results:

Lactometer reading, 100; specific gravity, 1.029; fat, 3.5 per cent.; acidity, 2.29; formaldehyde, 13 in 30; bacterial count, acid agar, 3,000,500; neutral agar, 4,876,134.

In all of these examinations the lactometer readings were made from the New York Board of Health Lactometer used by the inspectors of the department. The specific gravity is determined from the lactometer reading at a temperature of 60°. The fat was determined by the modified Babcock method, and the acidity is given in c.c.s. of normal sodium hydroxide solution neutralizing 100 c.c.s. of milk. The agar was neutral or 1 per cent. acid, and the formaldehyde tests were made by Helmer's sulphuric acid test.

*Summary of the Bacteriological Examination of the Milk Supply for the past Six Years.*

The bacteriological examination of the milk supply of the city was begun January 1, 1897, and has continued until the present time.

The first series of examinations was made by Dr. Arthur Wegefarrh and myself, to find out how many cows in a given number supplying milk to the city were affected with inflammatory disease of the udder. This can be detected by examining the milk and the strippings from individual cows, and if the pus cells are above 20 to the field of the immersion lens, after centrifugalizing 10 cubic centimeters, and spreading the sediment on a slide, the cow is considered unfit for furnishing milk to the community.

This condition is called garget, and the conclusions arrived at in the investigation show how a microscopic examination of the milk from individual cows will exclude animals from the herd who will otherwise introduce pus-cells and streptococci into the mixed milk used for human consumption. During 1901 a large number of cows within the city limits were examined by this method, and a number were found suffering from garget. These animals were condemned by the department, and the milk was not used in the trade. The passage of an ordinance compelling the use of pasturage for cows kept within the city limits has greatly lessened the number of diseased cows supplying milk to the public. During 1900, Miss E. M. White made a large number of examinations of the city milk for pus-cells and also estimated the bacteria present in many samples of milk. Her article, found in the report for 1900, doubtless had influence in securing the legislation mentioned above.

The results and conclusions concerning the presence of pus in milk were as follows:

*Examination of Milk from individual Cows for Pus-cells.*

No. 1 consists of 100 cows in the country, kept in a well-ventilated stable, with good roomy stalls and good pasturage. They are fed while in the stable on bran, ground corn and hay. The cows are curried and cleansed daily. The herds are inspected by competent veterinary surgeons, and all sick animals are isolated. The usual precautions regarding cleanly milking are observed.

No. 2 consists of 50 cows in the country having badly ventilated stables, narrow stalls and bad pasturage. They are fed on distillery grains, cut hay and bran, the precautions mentioned above as regards inspection and cleanly milking are not observed.

No. 3 consists of 100 cows kept in the city, always confined to stables, with narrow stalls, no ventilation, light or pasturage. They are fed on brewery grain, distillery slops,

bran and hay. The cows, as a rule, never leave the stable until they go dry or are taken out to be exchanged. The milk was furnished by the city veterinarian, Dr. George C. Cornelius, who was careful to select different sections of the city, and who personally superintended the drawing of the milk.

The results follow: Examinations by 1-12 inch oil immersion lens.

The above tables show that grade No. 1 gives a general average of 1.1 pus cells to the field.

No. 2 gives an average of 11.3, while No. 3 shows 19.2. In herd No. 1, practically no pus organism, such as streptococci or staphylococci were found. Herd No. 3 showed streptococci present in large numbers; by cover slip in eight instances. The regular nucleus of the epithelial cell enabled us to exclude these bodies in our counts.

The milks mixed from the various herds of grade No. 3 showed streptococci, bacteria and pus.

The highest number of the pus cells in any one cow was 158.5 to the field. The lowest in grade No. 3 was 1, and there were only 5 which gave this percentage, while in grade No. 1 there were 45.

Seventy-five cows gave an average in grade No. 1 of less than 1 cell to the field, while in grade No. 3, out of 100 cows, there were 12.

Ninety-three cows out of 100 in grade No. 1 gave less than 5 cells to the field, while in grade No. 3, 38 gave this average.

Ninety-eight cows in grade No. 1 out of 100, gave less than 10 cells to the field; in No. 3 grade, 54 out of 100 showed this number.

#### *Conclusions.*

Garget, or inflammation of the udder or teats, is a not infrequent condition among the many herds supplying milk to various cities or communities.

Milk from individual animals often contain many pus cells, and the accompanying organisms of suppuration.

The study of the epidemic just described, as well as the important work of Booker and others, certainly strongly suggests that such milk is capable of causing the various forms of gastro-enteritis, especially in children and infants.

The microscopic examination of the centrifugalized sediment of the milk from a herd of cattle if found to contain an excessive amount of pus, should suggest a careful inspection of the herd.

*General Summary concerning the Bacteriological Examination of the Milk Supply.*

The microscopic examination of the milk from each cow of a herd has shown that certain cows suffer from inflammation of the udder, and that these cows introduce the germs of inflammation into mixed milk used for human food.

The table of the summary of city inspections shows a fair condition of the milk from a bacteriological standpoint when received at the stations, but this condition is not as good in the milk taken from stores, wagons, and condemned samples. It is an interesting point that the acidity increases as the bacterial count increases, and the use of acidity tablets for determining the acidity might give a general idea of the variation in the bacterial count during the various seasons. The presence of formaldehyde does not seem to have caused the diminution of bacteria in many samples.

Park, the Assistant Bacteriologist to the New York Department of Health, has made a large number of examinations of the New York milk supply, and in many of the samples he found that the bacteria were present in enormous numbers, at times running from 10 to even 100 million to the cubic centimeter under certain conditions. He thinks that it is possible for a municipality to maintain a certain standard to which milk should conform, and he recommends 500,000 as the standard per cubic centimeter for milk at the

stations, and 1,000,000 per c.c. for milk in general distribution. Our examinations show that some of the milk both at the stations and during delivery and while awaiting sale does not conform to this standard for bacterial purity.

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#### BACTERIOLOGICAL AND CHEMICAL EXAMINATION OF THE ICE-CREAM SUPPLY.

During the past summer Miss Henrietta M. Thomas, of the Woman's Medical College, made a number of analyses of samples of ice cream and hokey-pokey.

Her paper in detail is published in the January number of the Maryland Medical Journal, and as this work was done under the direction of the department a summary is given of the results.

Dr. J. König found from 8.17 per cent. to 70.10 per cent. of fat in fresh cream in Germany. In the samples of ice cream examined the per cent. of fat was never higher than 11.2, and in one instance it was as low as 1.25. Of course, we must remember that flavorings, sugar, eggs, etc., are added to the fresh cream, so that we cannot expect to find as great an amount of fat in ice cream as we do in ordinary cream. Still, when the per cent. is as low as 3, or even 4, we may feel reasonably sure that that so-called ice cream came more from the bottom than the top of the pail.

Turning now to the bacteria found in ice cream, we will first consider the number present in 1 c. c. This varied from 378,000 to 36,600,000. In some very interesting investigations made by Drs. H. W. Conn and W. M. Esten<sup>2</sup> they found that in sweet cream collected for ripening the number of bacteria ranged from a figure too small to be ascertained in the dilution used to 36,000,000. From this it would seem that the number of bacteria in ice cream is practically the same as that in fresh cream. That this is



the case is rather remarkable when we consider the unsterilized substances which have been added, and that the mixture has been put into unsterilized cans. It may, however, be partly accounted for by the fact, according to experiments made by Dr. Prudden,<sup>3</sup> that there are varieties of bacteria which are reduced by freezing.

### *Bacterial Species found.*

A few saprophytic bacteria and chromogenic bacteria were isolated, and the colon bacillus, the normal inhabitant of the intestine, was also frequently found. An organism resembling the pneumococcus, and several streptococci were also detected.

Her conclusions and tabulated results follow, and it may be stated that Dr. Henry Lee Smith made the original suggestions concerning her investigations. The counts were made from dilutions of 1-2000 in sterile water.

### *Conclusions.*

First—That cheap ice cream is extremely poor in fat, and that even in specimens from good confectioners the per cent. is not high.

Second—That the number of bacteria in ice cream is not materially higher than that found in fresh cream, though it is slightly higher.

Third—That the kinds of bacteria found in some of my specimens indicate either that the cows from which the milk was obtained were infected, or that the handling of the ice cream was very careless, thus rendering it unsuitable for food. Both of these causes of contamination can and ought to be obviated. Thoroughly clean handling of ice cream is of as great importance as is that of milk, and the sooner doctors insist that ice cream given to their patients be only from entirely trustworthy sources the sooner will this care be given.

In conclusion, I would refer to the accompanying tables, which give further details of the work:

	Per Cent. Fat.	Aerobic Bacteria in 1 c. c.	Media used.	Anaerobic Bacteria in 1 c. c.	Bacterial Species.
Hokey-Pokey .....	3.4	378,000	Gelatine.	Colon.	
	2	684,000	Hiss'.	1,656,000	
	1.25	684,000	Hiss'.	840,000	
	1.4	1,000,000	Gelatine.		
	1.6	9,204,000	Hiss'.		
	2.	6,840,000	Hiss'.	5,664,000	Bacillus Annulatus.
	2.	660,000	Gelatine.		
	2.	5,000,000	Agar.	1,872,000	
	2.8	1,500,000	Gelatine.	444,000	
	3.4	11,112,000	Hiss'.	1,000,000	
	3.6	36,600,000	Agar.		Colon, Pneumococcus.
	3.8	2,670,000	Gelatine.		
	4.5	5,067,000	Agar.		Coccus.
	5.	15,000,000	Agar.	3,324,000	Pneumococcus.
	5.4	17,500,000	Hiss'.		
Ice-Cream .....	6.	6,260,000	Agar.	2,230,000	
	8.	5,718,000	Agar.		Bacillus Arborescens.
	8.	7,200,000	Agar.	2,000,000	Colon.
	8.	8,280,000	Agar.	2,400,000	Pneumococcus?
	8.	6,720,000	Agar.		
	8.8	1,110,000	Hiss'.	3,000,000	Yeast.
	9.4	2,030,000	Gelatine.	91,000	
	11.2	3,160,000	Agar.		Lemon Yellow Tetrad.
		4,250,000	Agar.	234,000	Cream-colored Tetrad.
		1,776,000	Agar.	212,000	The Gas Bacillus, Streptococcus and Yel-
		3,155,000	Hiss'.	362,000	[low Tetrad.
		1,404,000	Hiss'.		Yeast.
Snowball .....		400,000	Hiss'.		Colon.
		250,000	Hiss'.		Colon.

## EXAMINATION OF SPECIMENS OF DISEASE FOR PHYSICIANS.

Table No. 4 will show the work performed in the laboratory for the physicians of the city. In 1900, 2,202 specimens for diphtheria were examined; in 1901 we examined 1,884, and in the past year only 1,749 came to the laboratory. This is probably due to the general decrease in this disease.

In 1900, the Throat inspector made 4,200 cultures from children in infected houses, and in 1901 he made 2,712. During the last year he only made 1,905 cultures, but this again is due to the smaller number of infected houses. 97 throats contained the germs of diphtheria, and if these children had mixed with the public the disease would have been spread to healthy children and even adults. Only 42 cultures were taken from the throats of school children, and diphtheria might be even more reduced if a general inspection of schools were possible with the present force. 3 were found positive in the school room, and removed until well.

845 examinations were made for tuberculosis, and 262 were positive.

Table No. 5, which follows Table No. 4, shows the total amount of tests made for physicians during the past seven years. Nearly 50,000 specimens have been sent by physicians during this time.

TABLE No. 4.

Examinations of Specimens to Determine the Presence of Disease.

Diphtheria, positive cultures.....	417
"    negative    "    .....	1,288
suspicious cultures.....	31
unsatisfactory cultures.....	13
Diphtheria, total cultures.....	1,749
Diphtheria, positive cultures of school children's throats.....	3
"    negative    "    "    "    "    .....	39
suspicious    "    "    "    "    .....	
Diphtheria, total cultures of school children's throats.....	42
Diphtheria, positive cultures examined by throat inspector.....	97
"    negative    "    "    "    "    .....	1,808
Diphtheria, total cultures examined by throat inspector...	1,905
Tuberculosis, positive results.....	262
"    negative results.....	581
suspicious.....	1
unsatisfactory results.....	1
Tuberculosis, total results.....	845
Typhoid fever, positive reactions.....	493
"    negative reactions.....	739
suspicious reactions.....	103
unsatisfactory reactions.....	12
Typhoid fever, total reactions.....	1,347
Malaria, positive results.....	3
"    negative results.....	195
unsatisfactory results.....	2
Malaria, total results.....	200
Antitoxin, units supplied in indigent cases.....	1,625,000
"    cases treated by Health Department.....	909
Vaccine virus, tubes supplied by Health Department.....	56,080
Water, complete examinations made.....	48
Examinations, miscellaneous.....	67

TABLE No. 5.

Showing the total number of Examinations for Physicians during the past seven years.

Examinations for diphtheria .....	13,081
“ of school children.....	5,816
“ for tuberculosis.....	6,265
“ “ typhoid fever .....	4,554
“ “ malaria.....	311
“ of miscellaneous specimens.....	172
“ made by throat inspector.....	14,218
Total .....	44,417

## THE USE OF ANTITOXIN IN THE TREATMENT OF DIPHTHERIA.

During the past year the department has furnished antitoxin for the treatment of 399 cases of diphtheria. There were 43 deaths, making a fatality rate of 10.7 per cent. This is a slight increase over last year, when the fatality was only 8.45 per cent. The department uses 2,000 units repeated every 12 hours until improvement takes place. In severe cases an initial dose of 3,000 units is often used.

In 160 cases the diphtheria bacillus was found and the number of deaths was only 11, or a fatality of 6.87 per cent. This is a very good record in verified cases, and it is unfortunate that many physicians will use the department antitoxin, and will not send in cultures. These are issued with the antitoxin, and should always be returned in order to arrive at correct conclusions. Many physicians will not do this, and we can not refuse to issue the antitoxin, since it might decrease the chance of the patient's recovery. The fatality in laryngeal diphtheria was only 16 per cent. Before the use of antitoxin these cases were usually fatal.

Striking results have been accomplished in preventing the spread of diphtheria. 251 children exposed to diphtheria in infected houses were immunized by the use of 1000 units of antitoxin, and not a child developed diphtheria. If these children had been protected by antitoxin many of them would have developed the disease.

Table No. 6, which gives the tabulated results also shows the importance of injecting the antitoxin in the early stages of the disease. When treated in the first 24 hours, the fatality is only 4.68 per cent., and 8.8 per cent. in the first 48 hours. It gradually increases after this time. The surprising number of 13 cases of cardiac paralysis shows the importance of keeping cases of diphtheria very quiet until all danger of cardiac exhaustion from the damaged heart muscle has passed.

Table No. 7 gives the results of antitoxin since 1898, and contains some very encouraging figures. In 2,196 cases considered diphtheria by the physicians only 218 died when treated with antitoxin, giving a fatality of 9.9 per cent. In 1,204 cases the diphtheria bacillus was found, and only 100 died, a fatality of 8.3 per cent. It is unfortunate that in 994 cases no cultures were taken as the statistics are not as accurate on this account. The comparatively small fatality in laryngeal cases and the increasing death rate as the injection of antitoxin is delayed is also shown in the table.

1,151 children in infected houses were immunized with 1,000 units each of antitoxin, and only six developed diphtheria. Several of these only received 500 units, and this dose is not always protective.

When the above figures are compared with the previous fatality of 55 per cent. in Baltimore before the use of antitoxin, and to Welch's figures of 42.1 per cent. the practical results in the saving of human life are to say the least gratifying. Not only have many lives been saved, but the persistent decrease in the cases of diphtheria treated and reported shows that the spread of the disease has been limited, partially by this work.

TABLE No. 6.  
Cases of Diphtheria Treated with Antitoxin Furnished by the Health Department from January 1, 1902, to December 31, 1902.

Cases.	Deaths.	Mortality.	Extent of Membrane.				Complications.				Cases Immunized.			
			Tonsils.	Tonsils and Pharynx.	Nasal.	Larynx.	Broncho-pneumonia.	Nephritis.	Sepsis.	Paralysis.	(Cardiac Paralysis.	Total.	Successful.	Diphtheria Developed.
399	44	10.7	254	84	20	80	3	1	2	10	13	251	251	0
Cases in which diphtheria bacilli were found..... 160														
Deaths resulting..... 11														
Percentage of mortality..... 6.87														
Cases of laryngeal diphtheria..... 80														
Deaths resulting..... 16														
Percentage of mortality..... 20														
Mortality After Use of Antitoxin According to Duration of Disease at Time of Injection.														
			First day.	Second day.	Third day.	Fourth day.	Fifth day.	Sixth day.	Seventh day.	Eighth day.	Tenth day.	Unknown.		
Cases.....			128	125	80	88	15	1	6	3	1			
Deaths.....			6	11	6	3	2	0	1	0	1			
Percentage.....			4.68	8.8	7.5	7.8	13.3		16.6		100			
Mortality in cases not treated with antitoxin (Welch)..... 42.1 per cent.														
Average mortality in Baltimore for four years (1894, 1895, 1896, 1897) prior to the use of antitoxin.. 55.18 per cent.														



TABLE No. 7.  
Cases of Diphtheria Treated with Antitoxin Furnished by the Health Department from January 1, 1898, to December 31, 1902.

Cases.	Deaths.	Mortality.	Extent of Membrane.				Complications.				Cases Immunized.			
			Tonsils.	Tonsils and Pharynx.	Nasal.	Larynx.	Broncho-Pneumonia	Nephritis.	Sepsis.	Paralysis.	Cardiac Paralysis.	Total.	Successful.	Diphtheria developed.
2196	218	9.9	1028	667	184	347	21	27	25	45	54	1151	1145	6
												3 yrs.	3 yrs.	
												1151	1145	
									</					

## DIVISION OF THROAT INSPECTION AND DISINFECTION.

The report of the Throat Inspector, Dr. Alan W. Smith, which follows this report, shows 792 houses visited. This work is of the utmost importance, as 97 children were found with diphtheria bacilli in their throats. Thirty-six of these showed no clinical symptoms of diphtheria, but they were capable of transmitting the disease to less resistant persons if allowed to mix with the public. The details of the report are important.

When the Throat Inspector declares the culture free from diphtheria bacilli, the diphtheria sign is removed, and the infected rooms are disinfected by formaldehyde gas. Test cultures are placed in the rooms, and are returned by the house-holder after opening up the room. If the tests show that the germs have been destroyed, the house is declared free from infection; but if the cultures made from the tests cultures are found to contain germs, the fumigator repeats his work, unless the open condition of the room renders complete disinfection impossible.

The detailed report of the Superintendent of Disinfection, Major Geo. C. Wedderburn, shows the number of cultures made from the various houses reported for fumigation, and these results were as follows:

Negatives, 1,018; positive, 224; not returned, 132; returned without cotton, 4. Total, 1,378.

This report also contains some interesting figures concerning the different diseases for which fumigation was performed.

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GROSS AND MICROSCOPIC EXAMINATION OF DISEASED FOOD PRODUCTS.

A number of specimens have been brought to the laboratory by the two abattoir inspectors for examination, and the following table shows the results of the gross and micro-

scopic examination. These specimens were mainly obtained from the Union Abattoir, receiving about 5,000 cattle weekly.

Human beings can contract such diseases as tuberculosis, actinomycosis (lump jaw), tape-worm, hydatid disease, and trichinosis from diseased animals used as food, and the examinations were made to detect the presence of such diseases.

Owing to the numerous other examinations devolving upon the one bacteriologist provided by the city, this work has been limited, and it is a pity that some special fund can not be found to extend this work, and determine the exact amount of diseased meat sold to the city consumers.

Table No. 8 shows the result of these examinations in detail.

TABLE No. 8.  
Microscopic Examination of Food.

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Abscess formation.....	4
Diseased skin (hog).....	4
Tuberculosis.....	6
Actinomycosis.....	17
Carcinoma.....	1
Infection with <i>B. bovissepticus</i> .....	1
Milk.....	2
Normal.....	3
<hr/>	
Total.....	38

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#### CONCLUSIONS AND RECOMMENDATIONS.

The summary of the examination of the pump water shows that the sub-soil is thoroughly saturated with the seepage from the cess-pits. The results from the general supply show that the impounding reservoirs reduce the results of pollution of the water-shed somewhat, but that some intestinal and other bacteria still reach the consumer.

The examination of the milk supply indicates that milk is sometimes used which contains millions of bacteria. These numbers can be greatly reduced by proper handling of the milk at the farms, and methods of refrigeration. The Farrington acid tablets might give a general indication of the bacteriological condition of any given milk supply.

The work in the prevention and cure of diphtheria by antitoxin speaks for itself, but the physicians should be prompter in returning clinical blanks, and more willing to take cultures in suspected cases. The examination of nearly 50,000 specimens in seven years shows that the laboratory is considered of some practical use to the profession.

I would respectfully recommend that the list of the culture stations be somewhat revised, so that some of the outlying districts can be better supplied, and in order that several culture stations within 2 or 3 blocks of each other should not exist. The list given to physicians should be printed by wards, and the diagnosis of dysentery, respiratory infections other than tuberculosis, and uterine infections should be provided for by proper apparatus for that purpose.

I would also recommend that a small sum of money be used to pay for any investigation which might be of benefit to the city. Several valuable pieces of work have been already performed by competent persons without any pecuniary reward.

In conclusion I wish to express my appreciation of the faithful services of Mr. J. A. Campbell, Laboratory Clerk, and of Grover C. Benser, Laboratory Assistant.

Respectfully yours,

WM. ROYAL STOKES, M. D.,  
*Bacteriologist to the Sub-department of Health.*



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**REPORT**

— OF THE —

**Quarantine Hospital of the Port of Baltimore.**

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# REPORT.

BALTIMORE, December 31, 1902.

JAMES BOSLEY, M. D., *Commissioner of Health.*

SIR—I have the honor to herewith submit the report of the Quarantine Hospital for the year ending December 31, 1902.

During the year nine hundred and eighty two vessels were boarded and inspected (see table 1), which is 25 less than in 1901, and from these vessels we have collected and paid into the City Treasury the sum of fifteen thousand six hundred and forty-three dollars and seventy-four cents (\$15,643.74), (see table 2), which is two thousand one hundred and sixty-one dollars and eighty cents (\$2,161.80) less than in 1901, and two thousand six hundred and sixteen dollars and eight cents (\$2,616.08) less than in 1900, which shows a marked decrease in foreign tonnage entering this port in the past two years, which has appreciably reduced the revenues of this station.

Table 3 shows the number and class of vessels with sickness on board or from infected ports detained at quarantine for fumigation and disinfection. There were 27 in all, the large majority of which were vessels bringing iron ore from infected ports with charters to load at southern ports, where a detention of from three to five days would be enforced did they not ask for, and receive disinfection at this port, which is completed in six hours, and a certificate given, thereby saving the vessel several days delay at the port of loading.



Forty-three persons were received at this hospital during the year, thirty-five of whom were suffering from smallpox, and eight were quarantined because they had come in contact with the disease (see table 4), seven deaths occurred and one patient remains in the hospital.

The cost of maintaining the Quarantine Station for the year was, for salaries, \$11,065, and for general expense, \$7,560, making a total of \$18,625, deducting the revenues derived from the shipping leaves the station an actual expense for the year, of \$2,981, which, taking into consideration the decrease in the revenues from the shipping, as compared with 1900 and 1901, and the number of patients taken care of, is, I think, a remarkably good showing.

A very substantial launch was added to the equipment of the station and the "Hygeia" had a new boiler placed in her during the year. I must again call your attention to the necessity of barracks for the detention of suspects, the want of which has been greatly felt in the proper handling of vessels with quarantinable disease on board.

Through the courtesy of the Engineer of the Harbor Board, the tug "Baltimore" has on several occasions taken the place of the "Hygeia" when the latter had to go to the shop for repairs, thereby saving the cost of hiring a boat.

In conclusion, I desire to thank Dr. T. W. Clark for his assistance, and to say that the employees of the place have performed their duties in a manner deserving the praise of the department.

Very respectfully,

S. O. HEISKELL, M. D.

*Quarantine Physician.*

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# TABLES.

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TABLE No. 1.

Showing the Number of Vessels Boarded and Inspected at the Quarantine  
for the Year Ending December 31, 1902.

MONTHS.	CLASS OF VESSELS.					
	Steamships.	Ships.	Barks.	Brigs.	Schooners.	Total.
January .....	43	.....	2	.....	.....	45
February .....	36	.....	.....	.....	1	37
March .....	48	2	5	.....	1	56
April .....	68	.....	2	.....	3	73
May .....	74	.....	3	.....	31	108
June .....	87	1	3	.....	55	146
July .....	79	.....	3	.....	29	111
August .....	83	.....	1	.....	12	96
September .....	85	.....	3	.....	14	102
October .....	66	.....	5	.....	6	77
November .....	60	1	3	.....	2	66
December .....	62	.....	3	.....	.....	65
Total .....	791	4	33	.....	154	982

TABLE No. 2.

Showing the amount of money received for Quarantine Fees and paid to the City Register for the Year Ending December 31, 1902.

MONTHS.	CLASS OF VESSELS.					
	Steamships.	Ships.	Barks.	Brigs.	Schooners.	Total.
January....	\$ 852 81	.....	\$13 25	.....	.....	\$ 866 06
February....	709 68	.....	.....	.....	\$ 8 46	718 14
March.....	982 50	\$30 89	34 94	.....	2 00	1,050 83
April.....	1,192 28	.....	13 57	.....	10 09	1,215 94
May.....	1,251 17	.....	19 06	.....	152 71	1,422 94
June.....	1,491 77	13 29	17 69	.....	206 46	1,729 16
July.....	1,368 67	.....	24 12	.....	139 51	1,527 30
August.....	1,582 38	.....	8 36	.....	91 45	1,682 19
September..	1,578 49	.....	19 04	.....	84 75	1,682 28
October....	1,234 87	.....	36 99	.....	28 30	1,800 16
November..	1,213 49	24 92	17 15	.....	10 63	1,266 19
December..	1,159 80	.....	28 25	.....	.....	1,183 05
Total.....	\$14,612 91	\$69 10	\$227 42	.....	\$734 36	\$15,648 74

TABLE No. 3.

Showing the Number and Class of Vessels Detained at Quarantine for  
Cleansing and Disinfection for the Year Ending December 31, 1902.

MONTHS.	CLASS OF VESSELS.					Total.
	Steamships.	Ships.	Barks.	Brigs.	Schooners.	
January.....	1	.....	.....	.....	.....	1
February.....	2	.....	.....	.....	.....	2
March.....	1	.....	.....	.....	.....	1
April.....	3	.....	.....	.....	.....	3
May.....	.....	.....	.....	.....	1	1
June.....	3	.....	.....	.....	.....	3
July.....	1	.....	.....	.....	.....	1
August.....	2	.....	.....	.....	.....	2
September.....	5	.....	.....	.....	1	6
October.....	3	.....	.....	.....	.....	3
November.....	.....	.....	.....	.....	.....	.....
December.....	4	.....	.....	.....	.....	4
Total.....	25	.....	.....	.....	2	27

TABLE No. 4.

Showing the Number of Patients Treated at the Quarantine Hospital for the Year Ending December 31, 1902.

DISEASE.	Remaining over from 1901.	Received from 1902.	Discharged in 1902	Died in 1902.	Remaining in Hospital.	Total.
Smallpox .....	1	35	28	7	1	86
Quarantined .....	.....	8	8	.....	.....	8
Total .....	1	43	36	7	1	44



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# **REPORT OF THE CHEMIST.**

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REPORT UPON THE CHEMICAL LABORATORY OF  
THE HEALTH DEPARTMENT FOR THE  
YEAR ENDING DEC. 31, 1902.

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BALTIMORE MD., January 1, 1903.

DR. JAMES BOSLEY, *Commissioner of Health*:

DEAR SIR—Herewith I respectfully submit my report upon the  
Chemical Laboratory of the Health Department for the year 1902:

I.

MILK.

1. *Work Accomplished.*

The total milk examinations for 1902 amounted to 33,503 lots, aggregating 1,770,299 gallons. (See Table No. 1.) During 1901 the examinations amounted to 1,520,312 gallons, showing that with the same force—2 milk inspectors—250,000 gallons more milk have passed examinations as compared with 1901. Contrary to expectations, the total consumption of milk for 1902, roughly estimated, has been less than during the previous year (1901). The causes for this shrinkage are to be found—1st, in the failure of the hay crop and the very high prices of all feedstuffs, which forced a large number of dairymen to reduce their stock of cattle; 2d, in the advance in the price of milk, necessitating economy, especially among the poorer people; 3d, the remarkably cool summer of 1902, and a proportionate decrease in the consumption of ice cream. Thus the total consumption of milk for 1902 may be put down at about 7,500,000 gallons, which shows that about 24 per cent. of the milk handled in the city passed inspection.

## 2. *Quality of Milk.*

The total amount of milk condemned and spilled by the inspectors amounted to 557 lots, aggregating 2,944 gallons. (See Table No. 1.) Nearly 50 per cent. of this milk (1,441 gallons) was destroyed during the three summer months, June, July and August, not so much for being adulterated as for being found sour or churned at the railroad stations.

But taking into consideration the total amount of spills (2,944 gallons) and placing the total consumption at 7,500,000 gallons, only about .04 per cent. (4-100 of 1 per cent.) was condemned as unfit for use. Since the .04 per cent. is based upon about 24 per cent. of milk examined, and since it is reasonable to apply this as a ratio for the total amount of milk consumed in the city during the year, we find that over 99.8 per cent. constituted good, healthy and unadulterated milk, and that less than 2-10 of 1 per cent. was adulterated and unfit for use.

It is gratifying to state that the quality of the milk supply, as a whole, is at present in a very satisfactory condition. Following the lines indicated in my last report, your inspectors have been untiring in their efforts to secure for the public the pure and unadulterated article. The shippers of milk to the several railroad stations fully understand that they must deliver to the milk wagons pure and absolutely clean milk, and but very little trouble has been experienced during the year. At Calvert, Hillen and North avenue stations—which three stations furnish the bulk of the milk brought into the city by rail—frequently not a single gallon of milk was spilled during a whole month; whilst on the other hand, the milk shipped by a few old offenders, who insisted in shipping watered or filthy milk, was spilled day after day, until they either came to terms or were driven out of the market altogether.

Absolute cleanliness of cans and general sanitary conditions were insisted upon. Early in the year a different plan was adopted. Instead of simply spilling the milk at the depots when found wanting, your inspectors, whenever feasible, put themselves in personal touch with the shipper or his agent, and in a friendly but firm manner explained what was expected of them and what

the consequences would be. In cases where the shipper could not be communicated with at the depot, your Chemist addressed a letter to the offender. The way in which your inspectors—Messrs. Roth and Wilson—entered into this scheme is praiseworthy, and the results were most gratifying. With gentle but earnest persuasion, a great deal was accomplished, and this same method was extended to the owners or drivers of the milk wagons who deliver the milk to the consumer. During the inspections on the street the inspectors pointed out to the drivers of milk wagons or to the owners of city dairies that pure milk should register at least from 14 to 15 per cent. of total solids, and from 4 to 6 per cent. of butterfat; that that was what the railroads brought into the city and delivered to them and must not be tampered with, but delivered to the customers precisely as received. To the owners of dairies within or near the city limits who bring the milk direct into the city by wagons, the inspectors explained that cows fed on nothing but slop during the winter season, when pasturing is out of season, cannot furnish rich and wholesome milk; that the distillery slop must be mixed with middling, corn-chop, or other more substantial food. In short, the dairymen became gradually educated to what was expected of them, and since almost all of them were ready to listen and accept the warnings, the results as to the betterment of the quality of the milk surpassed our expectations. Another factor towards the improvement of the Baltimore milk supply which cannot be overestimated, and which has saved your inspectors and your Chemist a good deal of work and annoyance during the latter part of the year, is the passing of the cow-stable ordinance, which you so earnestly advocated.

During the summer of 1902 a number of investigations of a private nature, pertaining to the condition of the Baltimore milk supply, have been instituted, and in part published, which, if not fully understood as to their character, may be misleading.

There are in the city of Baltimore, say one thousand (more or less) small stores or shops, the great majority located in the poorer sections of the city, many in small basement apartments where cleanliness and satisfactory sanitary conditions are out of the question. Nearly all of these shops sell milk in small quantities.

Perhaps only a few of them handle as much as a five-gallon can of milk daily, purchased at one of the railroad stations at the wholesale figure. The rest get their milk supply from the wagons, a gallon or less, at a small discount. In either case, the milk as it is originally delivered to them is good, and has often passed a satisfactory examination by one of the inspectors. The shipper at the railroad station gives them the pure article, and the dairyman, whose route is certainly not confined to any particular section of the city, and who deals the milk out of his churn to all of his customers, rich or poor alike, cannot discriminate. Yet there is no denying the fact that the small amount of the milk dealt out over the dirty counters or tables of these places in one cent and two cent quantities is, in most cases, absolutely unfit for use, watered and filthy, dangerous to infants, and productive of disease. In many instances, proper refrigerators in summer are out of the question. The small quantity of milk which they handle is kept anywhere; the shop is often the living room of the family; children, possibly afflicted with some disease, attend to the customers, and the consequences are serious. Where lies the remedy? The milk inspectors, whose duty it is to control the milk supply of Baltimore, or as much of it as lies in their power, cannot spend the day in a small basement shop watching perhaps one gallon or one-half of a gallon of milk. If an inspector enters the store in the morning or shortly after the milk has been delivered, he may find the pure and unadulterated article. As soon as he turns his back the milk may be doctored, the quantity stretched to its utmost limit, and sold, in many instances perhaps, as food for infants. The only remedy which suggests itself; is to prohibit such places from selling milk at all, if such is feasible. Why mothers who are obliged to feed their infants on cow's milk will buy milk at such places is unaccountable indeed. The wagons of a dozen responsible and conscientious dairymen pass the door of any and every dwelling, may it be in the poorest or richest locality of the city, and for precisely the same figure the mothers can purchase as little as a pint or a half pint of pure and rich milk to feed their infants. I do not mean to create the impression that the small stores of which I was speaking had been neglected by the inspec-

tors. On the contrary, as often as their time permitted it, these places were visited while the inspectors were looking for milk wagons on the street, and sanitary conditions enforced, if possible; but it can readily be imagined that a thorough control is a matter of future development.

As usual, quite a large number of comparison analyses of milk were made during the year from samples taken at random out of cans at the railroad stations, or out of the churns of the milk wagons, which milk had passed a satisfactory inspection and was considered pure and unadulterated. Table No. 2 gives the result of 48 such analyses selected from the list. The average of the 48 samples shows 13.99 per cent. of total solids and 4.85 per cent. of butterfat. In former reports I have repeatedly called your attention to the advisability of raising the present legal standard from 12 per cent. of total solids and 3 per cent. of butterfat, as prescribed by ordinance, to at least 13 per cent. of total solids and 4 per cent. of butterfat. It would facilitate our work immensely and give us a much better chance to vigorously proceed against a number of unprincipled shippers and dealers, who manipulate the milk with the aid of the lactometer, and by removing part of the cream and adding water, keep the specific gravity above 1.0290.

### 3. *Microscopic Examination of Milk.*

The microscopic examination of milk offers no new features. A large number of samples of milk were examined during 1902 for the possible presence of pathogenic organisms for pus and for the relative number of ordinary milk bacteria. No tables were kept, because in not one case was the bacillus tuberculosis found present, and in only a few instances, in samples of bloody milk shipped at railroad stations, streptococci were located. Only a comparatively few samples were absolutely free from pus. Since the milk in the cans of the shippers or in the churns of the dealers cannot represent the product from one individual cow, it is rarely possible to keep the milk entirely free from pus. However, in most samples under examination, but very few pus cells were present.

When a cow is suffering from disease the milk, as it leaves the udder, may contain various pathogenic organisms; besides which milk after being drawn is particularly liable to infection by bac-

teria from various sources, and considering the great rapidity with which bacteria multiply in such an excellent medium as milk, it is surprising that instances of infection are not more numerous. In most cases, milk taken from a cow suffering from disease, even from an infection of the udder itself, shows no striking departure from the chemical composition of normal milk. The guarding against such an infection can only be accomplished by a thorough inspection of the cows and exclusion of diseased cattle from herds, or by the sterilizing or Pasteurizing of the milk before use. The daily inspection of the milk supply of a large city cannot offer any assistance, as bacteriological examination of milk for pathogenic germs often requires days, and in no instance could the milk under examination be detained long enough to enable the Bacteriologist to establish the fact whether or not pathogenic micro-organisms are present.

The actual number of ordinary micro-organisms in milk have little or no bearing on the quality of normal milk. Since many species of bacteria are capable of reproducing themselves in 20 minutes, and since milk is the most favorable medium for the reproduction, the number of bacteria present depend altogether upon whether the milk has been properly aerated and cooled immediately after milking—whether it is kept on ice, in a cool or warm place, and on the length of time it is kept before using. To enter more fully upon this subject is not in the scope of this report; besides, it has been fully ventilated and published by a large number of very able authorities.

Absolute cleanliness, beginning with the sterilizing of the teats and hands before milking, and ending with the actual use of the milk by the consumer, will do much towards keeping down the number of bacteria; but whether good normal milk contains one million or two million bacteria per cubic centimeter is unimportant, except as to the feeding of cow's milk to infants. In this latter case the modern achievements of sterilizing, Pasteurizing and modifying of milk are such that the introduction of disease through milk is hardly possible.

#### 4. *Impure and Adulterated Milk.*

As usual, the principal adulteration consisted in the addition of water.

The large line of preservatives formerly used during the hot weather have almost entirely given way to the use of formaldehyde, this being the cheapest and most harmless of all preservatives. Whenever detected in milk, the offender was promptly notified and forced to discontinue its use. Outside of formaldehyde in only one case was boracic acid found to be present in milk. The practice of artificially coloring the milk by the use of azodyes has also greatly diminished, not a hundred gallons of milk having been spilled during the year on that account. In one case, where the party was caught in the act of adding the coloring fluid to the milk, the offender was promptly arrested and the fine imposed.

The amount of skim milk shipped to the several large bakeries from out of town creameries may be placed at about 400 gallons daily. Outside of this amount but little skim milk is handled in the city, and a careful watch was kept to prevent any possible fraud in this respect.

Your attention is called to a careful perusal of the work done by Mr. E. H. Schorer in the summer of 1902 at the Health Department laboratories, under the direction of Dr. Stokes and myself, and which you will find embodied in Dr. Stokes' report.

## II.

### WATER.

#### 1. *City Water Supply.*

Tables No. 3 and No. 4 illustrate fully the condition of the Baltimore water supply. The tables speak for themselves, and I leave it to you to draw your own conclusions. The presence of nitrites establish active decomposition of organic matter in the water and indicate intestinal pollution. In Table No. 3, out of 51 samples only 10 were free from nitrites, and 41 showed the presence of nitrites. The samples were procured not only from the laboratory taps, but from different localities of the city. But



whenever the chemical analysis was made at the same time and from the same tap, in conjunction with the bacteriological analysis by Dr. Stokes, and the colon bacillus was found to be present, with but very few exceptions the chemical analysis established the presence of nitrites.

Table No. 4 constitutes a number of analyses made from samples of tap water taken by the Health Wardens at the places indicated. Only two out of the eight samples were free from nitrites.

### *2. Pumps, Springs and Wells.*

Table No. 5 enumerates the analyses of pumps, wells and springs examined. Only two out of 18 were free from pollution. All the rest were polluted to such an extent as to render the water absolutely unfit for potable purposes.

The bacteriological analysis of these polluted samples, with but few exceptions, gave concordant results: large number of bacteria and the presence of colon bacillus. In a few instances, however, this was not the case. For example: In one case, when the chemical analysis gave 180 parts of chlorine and 18 parts of nitrates, besides very high figures for free and albumenoid ammonia and nitrates; in short, when the chemical analysis pronounced the water "badly polluted," the bacteriological analyses resulted in the finding of hardly any bacteria and the absence of colon bacillus. The sample had a decided acid reaction, and whether this accounted for the discrepancy or what caused it, I am unable to say. Dr. Stokes and myself intend to take up the matter during the present year, and hope to be able to throw some light upon this subject.

### *3. Sundry Water Analyses.*

Samples from two springs and one pump from the Industrial Home for Colored Girls, Melvale, Baltimore County—All three badly polluted and unfit for probable purposes.

Sample of water from St. Joseph's House of Industry—Polluted.

Sample of water from the premises of The Little Sisters of the Poor—Polluted.

Numerous samples of water from pumps or wells in homes—generally in the Annex—where typhoid fever existed, to establish the presence of intestinal pollution—No list kept.

The usual number of examinations of water out of cellars of houses, from ponds, cess-pools, etc., handed in by the Health Wardens and the Inspectors of Plumbing.

### III.

#### MISCELLANEOUS WORK.

Among the large number of investigations of a miscellaneous character were samples of sausage, meats, fish, flour, butter, oleo-margarine, cakes, candies, etc., and various articles of food which were suspected to have caused poisonous symptoms. Also disinfectants, paints, oils, etc. In reference to sausage, I beg to state that the war against artificially colored sausage has been kept up vigorously. Due to the untiring efforts of Mr. Charles Knell, "colored sausage is today a thing of the past." Only 3,576 lbs. of sausage were condemned during 1902, as against about 110,000 lbs. condemned during 1901.

The total number of analyses made at the chemical laboratory of the Health Department include:

Milk .....	447
Water—City water supply, pumps, wells and springs...	178
Water—Cellars, ponds, cess-pools, etc. ....	170
Sausage and meat.....	313
Coal ...	280
Miscellaneous .....	406
<b>Total .....</b>	<b>1,794</b>

The 280 analyses of samples of coal used by the various city departments have consumed a considerable portion of the time of your Chemist during 1902, and this will also apply to the present year. It has kept me very busy, and had it not been for the faith-

ful services rendered me by my assistant, Mr. R. De M. Taveau, I could not have done justice to the work pertaining to my position proper as Chemist to the Health Department.

Dr. Stokes, in his report, has made a comparison between my chemical and his bacteriological examinations of the water supply, and I deem it advisable to add a series of tables, which summarizes the results of the work done in my department from 1897 to the present day.

The Bacteriologist has demonstrated by his examinations that our sub-soil is thoroughly polluted by the seepage from our cess-pits. I beg to call your attention to the fact that the averages of chlorine, nitrates, free and albuminoid ammonia, and worst of all, the presence of nitrites, in a great majority of the pumps and wells shows a surprising excess of the products of decomposition. This demonstrates the complete saturation of the sub-soil by sewage, and this condition is well illustrated from a chemical standpoint by Table No. 6.

32 pumps, wells and springs examined during 1897 give an average of 106.16 per million of chlorine and 47.57 parts of nitrates. Analyses made during 1898 of the pumps and springs in Druid Hill and Clifton Parks fully illustrate the effects of the proximity of dwellings or stables upon the condition of the water in the underground currents.

77 pumps, wells and springs analysed during 1899 give an average of chlorine of 63.5 parts, nitrates 12.4 parts.

70 pumps examined during 1900 average in chlorine 49 parts. 7 pumps in 1901 give chlorine 83.5 parts. The figures for free and albuminoid ammonia were correspondingly high, and when we consider that with comparatively few exceptions nitrites were found to be present in all the samples under examination, we must realize the consequences which confront us in the near future.

Thanking you for your courteous treatment and your ever readiness to aid me in the performance of my work, I remain,

Yours, very respectfully,

G. W. LEHMANN, PH. D.

*Chemist Health Department.*

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# TABLES.

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TABLE No. 1.  
Total Amount of Milk Examined and Spilled.

1902.	Examined.		Spilled.	
	Lots.	Gallons.	Lots.	Gallons.
January .....	2,977	146,279	25	154
February .....	2,597	131,268	23	133
March .....	2,697	134,658	15	74
April .....	2,949	151,154	51	258
May .....	3,085	163,082	48	240
June .....	2,797	151,165	44	349
July .....	2,767	152,693	103	512
August .....	2,944	161,410	142	580
September .....	2,227	119,292	4	58
October .....	2,933	160,974	42	233
November .....	2,408	136,354	29	161
December .....	3,122	161,970	31	192
	33,503	1,770,299	557	2,944

TABLE No. 2.  
Comparison Analyses of 48 Samples of Milk from Railroad Stations and  
Delivery Wagons.

1902.	Specific Gravity.	Solids.	Fat.	1902.	Specific Gravity.	Solids.	Fat.
January....	1.0300	14.25	5.10	July.....	1.0240	14.40	6.80
" .....	1.0295	13.90	4.65	" .....	1.0290	14.10	4.10
" .....	1.0305	14.15	4.80	" .....	1.0295	13.65	5.00
" .....	1.0285	14.30	4.15	" .....	1.0280	13.80	5.20
February...	1.0290	15.10	5.00	August....	1.0285	12.04	4.20
" .....	1.0290	14.25	4.60	" .....	1.0290	13.45	4.20
" .....	1.0310	13.80	3.95	" .....	1.0280	14.95	6.60
" .....	1.0295	14.00	4.00	" .....	1.0320	13.54	4.50
March .....	1.0310	14.20	4.10	September..	1.0270	15.20	7.80
" .....	1.0280	13.05	3.95	" .....	1.0290	14.04	4.70
" .....	1.0290	13.60	4.40	" .....	1.0290	14.65	4.40
" .....	1.0295	13.10	3.75	" .....	1.0285	13.65	4.65
April .....	1.0290	12.65	4.10	October ....	1.0280	14.60	5.00
" .....	1.0310	14.05	3.60	" .....	1.0305	13.57	4.10
" .....	1.0280	13.19	4.20	" .....	1.0285	13.45	4.40
" .....	1.0290	13.80	4.50	" .....	1.0305	13.65	4.50
May.....	1.0280	13.65	5.00	November..	1.0345	15.00	5.20
" .....	1.0285	13.65	5.20	" .....	1.0320	13.95	4.00
" .....	1.0290	13.85	5.00	" .....	1.0295	14.12	5.50
" .....	1.0310	14.00	3.95	" .....	1.0290	15.10	6.50
June.....	1.0300	14.05	8.00	December..	1.0310	13.15	4.40
" .....	1.0320	13.45	4.40	" .....	1.0320	15.10	6.00
" .....	1.0300	13.85	5.20	" .....	1.0330	14.65	5.40
" .....	1.0300	14.00	4.60	" .....	1.0340	15.05	5.45

TABLE No. 3.  
City Water Supply.

1902.		Volatile Solids.	Mineral Solids.	Total Solids	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Nitrates.	Nitrites.	Required Oxygen.	Hardness.
January .....	8	64	55	119	4.05	0.05	0.11	0.71	Present.	2.14	48.60
	15	53	51	104	3.85	0.04	0.10	0.66	"	1.72	46.10
	22	52	52	104	3.65	0.04	0.14	0.70	"	1.80	46.00
February .....	29	64	34	98	3.50	0.07	0.17	0.61	"	1.95	46.00
	5	48	40	88	4.00	0.04	0.08	0.50	"	1.46	45.50
	12	57	47	104	3.90	0.05	0.15	0.83	"	1.85	46.00
	19	50	50	100	4.10	0.03	0.11	0.59	"	1.22	46.10
	26	61	43	104	3.95	0.04	0.16	0.72	"	1.74	47.80
March .....	5	66	36	102	4.16	0.04	0.10	0.76	"	1.44	49.20
	12	56	30	86	3.55	0.02	0.07	0.61	0.00	0.80	44.00
	19	59	40	99	3.80	0.06	0.12	0.70	Present.	1.90	51.00
	26	71	52	123	3.80	0.05	0.09	0.55	"	1.85	49.20
April .....	2	78	38	116	3.85	0.05	0.16	0.12	"	1.14	45.80
	9	55	40	95	3.16	0.03	0.12	0.88	"	0.95	46.00
	16	58	42	100	8.66	0.06	0.14	0.64	"	1.26	48.20
	23	65	55	120	4.05	0.05	0.10	0.48	"	1.53	48.00
	30	61	50	111	3.85	0.04	0.12	0.70	"	1.22	47.50
May .....	7	71	33	104	3.50	0.03	0.09	0.42	"	1.33	44.90
	14	50	40	90	3.10	0.03	0.10	0.51	0.00	0.95	46.01
	21	69	35	104	4.40	0.06	0.14	0.90	Present.	2.10	46.30
	28	49	39	88	3.90	0.05	0.15	0.62	"	1.28	49.00
June .....	4	57	39	96	4.00	0.04	0.12	0.60	"	1.08	50.10
	11	56	42	98	3.85	0.06	0.14	0.61	"	1.42	49.00
	18	50	46	96	4.04	0.05	0.10	0.83	"	1.11	51.50
	25	50	48	98	4.16	0.07	0.19	0.59	0.00	1.15	54.10

July .....	2	39	41	80	3.65	0.04	0.10	0.82	0.00	0.95	47.00
	9	40	36	76	3.50	0.06	0.14	0.56	Present.	0.90	47.10
	16	47	42	89	4.05	0.06	0.18	0.58	"	1.35	48.60
	23	49	48	97	4.10	0.11	0.14	0.60	"	1.10	48.40
	30	41	63	104	3.85	0.05	0.15	0.71	"	0.95	50.15
August .....	6	50	52	102	4.30	0.16	0.19	0.60	"	1.15	54.60
	13	45	51	96	4.00	0.06	0.16	0.45	0.00	0.90	50.50
	20	50	45	95	4.10	0.04	0.11	0.60	0.00	0.73	53.10
	27	49	36	85	3.00	0.05	0.09	0.50	0.00	0.80	51.00
	3	41	29	70	4.80	0.08	0.18	0.72	Present.	0.95	48.60
September .....	10	52	42	94	3.90	0.05	0.15	0.45	"	1.15	45.20
	17	60	34	94	4.20	0.05	0.20	0.50	"	1.40	50.20
	24	60	38	98	4.85	0.04	0.18	0.71	"	1.25	46.00
	1	53	45	98	5.00	0.04	0.12	0.85	"	0.79	44.10
	8	45	58	103	4.50	0.10	0.16	0.60	0.00	1.20	48.10
October .....	15	50	58	108	4.20	0.16	0.22	0.56	Present.	1.40	43.80
	22	40	35	75	3.20	0.04	0.08	0.72	0.00	0.85	46.20
	29	40	26	66	3.20	0.03	0.06	0.55	0.00	1.02	52.80
	5	59	48	107	4.10	0.05	0.16	0.74	Present.	1.00	49.90
	12	72	20	92	4.20	0.04	0.16	0.82	"	1.21	51.10
November .....	19	60	39	99	3.95	0.05	0.15	0.68	"	1.16	47.00
	26	55	45	100	3.80	0.08	0.20	0.53	"	0.80	48.05
	3	46	46	92	3.20	0.11	0.16	0.55	"	0.95	45.90
	10	53	50	103	3.65	0.09	0.14	0.60	"	0.92	46.00
	17	48	24	72	3.00	0.12	0.19	0.60	"	0.89	47.60
December .....	31	45	38	83	3.25	0.08	0.18	0.08	"	1.00	49.20



TABLE No. 4.  
City Water Supply Taken from Taps, as Designated by Health Wardens, February, 1902.

1902.	Volatile Solids.	Mineral Solids.	Total Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates.	Nitrites.	Required Oxygen.	Condition.	
Ward....	13	82	74	156	5.60	0.04	0.11	1.20	Present	2.05	248 Roland ave.
"	15	69	62	131	3.30	0.03	0.08	0.97	"	1.61	1733 W. North ave.
"	17	46	45	91	4.20	0.03	0.08	0.90	0.00	1.16	601 Pennsylvania ave.
"	20	60	53	113	2.80	0.03	0.07	1.23	Present	1.68	1916 W. Pratt st.
"	21	69	33	102	4.00	0.04	0.10	1.01	"	1.56	1110 S. Faca st.
"	22	72	48	120	3.50	0.05	0.12	1.00	"	1.94	128 W. Conway st.
"	23	69	50	119	3.80	0.04	0.10	0.87	0.00	1.60	1508 S. Chester st.
"	24	69	53	122	4.00	0.03	0.12	0.95	Present	1.85	1417 Riverside ave.

TABLE No. 5.—PUMPS, WELLS AND SPRINGS.

	1902.	Volatile Solids.	Mineral Solids.	Total Solids.	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Nitrates.	Nitrites.	Condition.
Pump:										
200 block Hickory avenue.....	June..... 14.	188	66	254	43.50	0.04	0.16	14.12	Present.	Bad.
Spring:										
Wyman's wood.....	" ..... 14	32	62	94	11.00	0.05	0.12	1.16	"	Bad.
Wells:										
Ridgewood and Garrison aves..	" ..... 21	138	78	216	16.40	0.01	0.19	5.00	"	Bad.
111 Stafford street.....	July ..... 10				6.20	0.11	0.26		"	Bad.
1613 Hopkins avenue.....	" ..... 10				180.30	0.21	0.42	18.20	" "	Very bad.
Pumps:										
Twenty-seventh and Oak sts...	" ..... 15				30.10	0.18	0.30		"	Bad.
2852 Pennsylvania avenue.....	" ..... 19				47.30	0.07	0.21	16.25	" "	Very bad.
Spring:										
Foot of Reservoir st., D. H. Park	" ..... 31	260	98	358	49.20	0.85	1.90	10.00	" "	Very bad.
Pumps:										
Gilston and Franklin roads....	August..... 25				20.60	0.04	0.11	1.24	"	Bad.
Franklin road.....	" ..... 25				19.30	0.06	0.14	0.85	"	Bad.
Edmondson avenue extended..	" ..... 25				30.40	0.05	0.11	9.20	"	Bad.
Gelston Heights and Franklin avenue.....	" ..... 25				5.10	0.03	0.09	0.45	0.00	Good.
Franklin road .....	" ..... 25				4.00	0.09	0.14	0.60	Present.	Bad.

TABLE No. 4.  
City Water Supply Taken from Taps, as Designated by Health Wardens, February, 1902.

1902.	Volatile Solids.	Mineral Solids.	Total Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates.	Nitrites.	Required Oxygen.	Condition.	
Ward...	13	74	156	5.60	0.04	0.11	1.20	Present	2.05	.....	248 Roland ave.
"	15	69	131	3.30	0.03	0.08	0.97	"	1.61	.....	1733 W. North ave.
"	17	46	91	4.20	0.03	0.08	0.90	0.00	1.16	.....	601 Pennsylvania ave.
"	20	60	53	2.80	0.03	0.07	1.23	Present	1.68	.....	1916 W. Pratt st.
"	21	69	33	102	4.00	0.10	1.01	"	1.56	.....	1110 S. Paca st.
"	22	72	48	3.50	0.05	0.12	1.00	"	1.94	.....	128 W. Conway st.
"	23	69	50	3.80	0.04	0.10	0.87	0.00	1.60	.....	1508 S. Chester st.
"	24	69	122	4.00	0.03	0.12	0.95	Present	1.85	.....	1417 Riverside ave.

TABLE No. 5.—PUMPS, WELLS AND SPRINGS.

	1902.	Volatile Solids.	Mineral Solids.	Total Solids.	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Nitrates.	Nitrites.	Condition.
Pump:										
200 block Hickory avenue.....	June.....14	188	66	254	43.50	0.04	0.16	14.12	Present.	Bad.
Spring:										
Wyman's wood.....	".....14	32	62	94	11.00	0.05	0.12	1.16	"	Bad.
Wells:										
Ridgewood and Garrison aves..	".....21	138	78	216	16.40	0.01	0.19	5.00	"	Bad.
111 Stafford street.....	July.....10				6.20	0.11	0.26		"	Bad.
1613 Hopkins avenue.....	".....10				180.30	0.21	0.42	18.20	"	Very bad.
Pumps:										
Twenty-seventh and Oak sts...	".....15				30.10	0.18	0.30		"	Bad.
2852 Pennsylvania avenue.....	".....19				47.30	0.07	0.21	16.25	"	Very bad.
Spring:										
Foot of Reservoir st., D. H. Park	".....31	260	98	358	49.20	0.85	1.90	10.00	"	Very bad.
Pumps:										
Gilston and Franklin roads....	August.....25				20.60	0.04	0.11	1.24	"	Bad.
Franklin road.....	".....25				19.30	0.06	0.14	0.85	"	Bad.
Edmondson avenue extended...	".....25				30.40	0.05	0.11	9.20	"	Bad.
Gelston Heights and Franklin avenue.....	".....25				5.10	0.03	0.09	0.45	0.00	Good.
Franklin road.....	".....25				4.00	0.09	0.14	0.60	Present.	Bad.

TABLE No. 5.—PUMPS, WELLS AND SPRINGS—Continued.

	1902.	Volatile Solids.	Mineral Solids.	Total Solids.	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Nitrites.	Nitrites.	Condition.
Well:										
Gilmor lane and Twenty-ninth street.....	September. 9	64	52	116	30.50	0.08	0.42	6.15	Present.	Bad.
Pumps:										
242 Sycamore avenue.....	" 16	.....	.....	.....	25.10	0.05	0.24	10.20	"	Bad.
244 Sycamore avenue.....	" 16	.....	.....	.....	24.60	.....	.....	.....	"	Bad.
246 Sycamore avenue.....	" 16	.....	.....	.....	24.60	.....	.....	.....	"	Bad.
2300 North avenue.....	" 24	56	118	174	10.20	0.04	0.11	0.69	0.00	Good.

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TABLE No. 5.—PUMPS, WELLS AND SPRINGS—Continued.

	Condition.	Pump.	Well.	Spring.
W Gilmor lane and street.....				
Pun 242 Sycamore av				
244 Sycamore av				
246 Sycamore av				
2500 North aver				





TABLE No. 6—Continued.  
Analyses of Pumps and Springs in Clifton Park. Figures expressed in parts per million.

CLIFTON PARK.	Color.	Odor.	Reaction.	Matter in Suspension.	Total Solids 230° F.	Volatile Residue	Ignited Residue	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates.	Nitrites.	Sulphates as SO <sub>3</sub> .	Required Oxy- gen.	Hardness.	Character.
Pump, Golf Links.....	Murky ..	Musty ...	Neutral..	18.50	162	92	70	4.85	1.28	2.64	0.22	0.00	0.00	3.38	68.17	Polluted.
Spring, Gardener's house.	Clear ....	None ....	Neutral..	0.00	66	32	34	4.65	0.00	0.00	3.95	0.00	0.00	0.12	48.16	Very good.
Spring, Washington st....	Clear ...	None ...	Neutral..	0.00	97	59	38	11.64	0.00	0.02	4.16	0.00	0.00	0.22	67.14	Good.
Pump at stable.....	Clear ....	None ....	Neutral..	0.00	96	74	22	9.78	0.14	0.15	8.25	0.10	0.00	0.70	59.09	Polluted.
Pump, Mansion house...	Clear .....	None .....	Neutral..	0.00	44	20	24	5.05	0.02	0.06	0.62	0.00	0.14	0.42	31.74	Good.

TABLE No. 6.  
Analyses of Water from Polluted Pumps or Wells Analyzed During 1897, Figures Expressed in Parts per Million.

	Volatile Solids.	Mineral Solids.	Total Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates. Nitrites
Carroll street.....	38	19	57	7.45	0.02	0.18	0.20
Parkdale and Woodberry avenue..	67	128	195	13.49	0.09	0.15	12.50
1025 York road .....	283	655	938	93.60	0.14	0.24	132.77
Charles street avenue tollgate.....	133	80	213	42.24	0.21	0.08	38.56
1080 Huntingdon avenue .....	434	582	1,016	159.75	0.46	0.58	137.92
Mt. Olivet lane.....	308	183	491	96.21	0.05	0.07	39.60
515 Roland avenue.....	920	316	636	163.30	4.15	2.60	15.00
Park Heights.....	122	104	226	59.88	0.10	0.25	4.24
513 Madison street, Waverly.....	165	72	237	74.55	0.02	0.03	16.50
Oakford avenue and Garrison lane.	81	51	132	42.60	0.00	0.04	9.20
734 Gorsuch avenue, Waverly.....	464	567	1,031	268.85	0.42	0.70	252.00
420 Falls road.....	183	82	265	44.02	0.04	0.09	10.50
182 Old York road.....	434	181	615	115.02	0.12	0.15	28.00
Fifth avenue, Hampden .....	245	111	356	43.66	0.03	0.15	98.50
109 Millington lane.....	510	395	905	167.56	0.05	0.12	95.00
Calloway and Fairview avenue.....	58	48	101	6.74	0.75	1.15	0.05
3 Kennedy lane.....	212	108	320	44.37	0.00	0.06	19.70
545 Quarry avenue.....	738	296	1,034	156.91	0.00	0.10	45.50
2826 Lanvale street.....	276	172	448	51.12	0.00	0.05	18.60
207 Carroll street .....	342	114	456	58.22	0.00	0.12	19.50
59 Mount street .....	286	92	378	60.35	0.00	0.08	26.40
Chesterwood .....	668	766	1,434	688.70	0.00	0.00	0.05
311 Falls road.....	256	106	362	38.34	0.04	0.10	14.25
Franklin Terrace and Old York rd.	148	54	202	48.28	0.02	0.09	0.90
Linden Heights.....	61	78	139	40.82	0.00	0.00	15.20
Liberty street, Waverly .....	82	126	208	12.78	0.12	0.28	0.85
166 Old York road.....	260	195	455	97.27	0.20	0.42	45.50
Penwood Iron Pump.....	574	212	786	278.67	0.18	0.35	0.55
1005 Second street, Calverton.....	256	126	382	118.57	0.21	0.18	42.50
149 Chestnut avenue.....	312	122	434	98.69	0.04	0.10	116.42
Mount street, near Baker.....	678	548	1,226	171.11	1.25	0.10	214.50
112 Frisby street.....	154	104	258	34.08	0.04	1.11	51.20

TABLE No. 6—Continued.

TAPS, STREAMS OR WELLS.	Date.	Laboratory Number.	Total Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates.	Nitrites.	Conditions.
Pump, Patterson Park.....	1899.								
Pump No. 1, Carroll Park.....	April 4	270	538	93.50	0.12	0.38	156.20	0.02	Bad.
Pump No. 2, ".....	" 4	271	252	85.10	0.46	0.62	54.10	0.04	Bad.
Pump No. 3, ".....	" 4	272	278	24.45	0.00	0.08	50.40	0.00	Fairly good
Pump, No. 1116 Winchester street.....	" 22	273	192	17.52	0.80	0.71	20.40	0.09	Bad.
Pump, No. 2503 Eutaw Place.....	" 22	286	10.18	102.50	0.35	0.60	42.16	0.03	Bad.
Pump, No. 2323 Linden avenue.....	" 22	287	78	9.45	0.00	0.03	0.05	0.00	Good.
Pump, No. 201 West Monument street.....	" 22	288	160	34.40	0.04	0.07	0.70	0.00	Good.
Pump, No. 204 Dolphin street.....	" 25	290	396	67.55	0.35	0.40	16.50	0.09	Bad.
Pump, No. 2852 Pennsylvania avenue.....	" 25	280	608	88.00	2.95	3.08	19.25	0.00	Bad.
Pump, No. 2858 ".....	" 25	281	290	36.10	0.00	0.02	4.60	0.00	Good.
Pump No. 9, Baker Property.....	May 10	282	138	19.20	0.05	0.12	4.16	0.00	Fair.
Pump No. 11, Thomas and North avenues.....	" 10	284	532	45.10	0.35	0.71	1.15	0.05	Bad.
Pump, No. 2826 Lanvale street.....	" 12	287	603	140.65	0.52	0.62	1.75	0.04	Bad.
Pump, No. 18, Liberty road.....	" 20	291	270	62.40	0.02	0.05	18.50	0.03	Bad.
Pump No. 19, ".....	" 20	292	826	37.16	0.02	0.04	1.15	0.00	Good.
Pump No. 20, ".....	" 20	293	494	31.40	0.00	0.00	1.25	0.00	Good.
Pump No. 21, ".....	" 20	294	162	6.42	0.00	0.00	0.00	0.00	Very good.
Pump No. 22, ".....	" 20	295	250	16.70	0.00	0.06	1.35	0.00	Good.
Pump No. 23, Slingluff avenue.....	June 5	296	680	18.50	0.00	0.00	0.00	0.00	Good.
Pump No. 25, ".....	" 5	297	620	59.00	1.84	2.16	26.14	0.15	Bad.
Pump No. 26, ".....	" 5	298	290	21.10	0.00	0.00	0.16	0.00	Good.

Pump No. 27, Slingluff avenue.....	June	5	299	19.50	0.00	0.00	0.10	0.00	Good.
Pump No. 29, ".....	"	5	301	18.50	0.00	0.00	0.64	0.00	Good.
Pump No. 32, Windsor ave. & Eleventh st.	"	15	302	44.50	0.00	0.00	0.00	0.00	Good.
Pump No. 33, Liberty road.....	"	15	303	48.50	0.00	0.00	0.00	0.00	Good.
Pump No. 34, Beach avenue.....	"	15	304	44.50	0.00	0.00	0.00	0.00	Good.
Pump No. 35, Tenth street.....	"	15	305	44.50	0.00	0.00	0.00	0.00	Good.
Pump No. 36, Beach avenue.....	"	15	306	41.00	0.00	0.00	0.00	0.00	Good.
Pump, No. 2517 Pennsylvania avenue....	"	17	307	167.50	1.28	2.08	65.20	0.14	Bad.
Pump, No. 2651 ".....	"	17	308	327.50	2.16	1.46	68.40	0.00	Bad.
Pump, No. 2659 ".....	"	17	309	208.50	2.38	2.14	42.10	0.02	.....
Pump, cor. Penna. ave. and Clifton st. . .	"	17	310	230.00	0.42	0.31	49.20	20.06	Bad.
Pump, No. 1577 Clifton street.....	"	17	311	240.50	0.62	0.90	71.16	0.07	Bad.
City Laboratory Tap.....	"	18	312	106	5.30	0.02	0.05	0.62	0.00
Bull Mansion.....	"	18	313	274	50.51	0.04	0.07	0.78	0.00
Pump, Pulaski street and Liberty road....	"	30	314	550	110.00	0.00	0.06	21.50	0.00
Pump, cor. Pennsylvania and Fulton aves.	"	30	315	600	161.50	0.15	0.27	28.00	0.07
Pump, No. 201 Bloomingdale avenue....	"	30	316	630	112.50	0.04	0.03	35.10	0.00
Pump, No. 701 ".....	"	30	317	370	116.40	0.02	0.03	30.20	0.00
Pump, Butcher's lane.....	"	30	318	552	162.00	0.35	0.67	35.50	0.03
Pump, Slingluff avenue.....	July	6	319	300	22.00	0.00	0.00	0.21	0.00
Pump, Slingluff avenue.....	"	6	320	184	14.20	0.00	0.00	0.10	0.00
Pump, St. Peter's Cemetery.....	"	6	321	510	90.40	0.10	0.19	0.13	0.02
Pump, Liberty road.....	"	6	322	150	16.40	0.00	0.02	0.05	0.00
Pump, Liberty road.....	"	6	323	786	207.50	0.08	0.16	30.40	0.00
Pump, No. 2858 Pennsylvania avenue....	"	27	324	506	19.60	0.03	0.08	0.20	0.01
Pump, No. 2824 Pennsylvania avenue....	"	27	325	600	96.14	0.05	0.09	5.30	0.10
Pump, Elgin avenue.....	"	27	326	384	23.50	0.02	3.95	3.15	0.00
Pump, Elgin avenue.....	"	27	327	270	6.50	0.00	0.00	1.13	0.00
Pump, Elgin avenue.....	"	27	328	548	91.50	0.00	0.00	0.00	0.00
Well, West Arlington.....	"	27	329	192	20.16	0.05	0.08	0.15	0.00
Spring, Edmondson avenue.....	"	27	330	205	6.85	0.00	0.00	0.00	0.00
Pump, Hermitage, G. H.....	Aug. 11	331	280	22.10	0.00	0.00	0.00	0.05	0.00
Spring, Hermitage, M. H.....	"	11	332	220	11.25	0.00	0.00	0.08	0.00
Spring, Evergreen.....	"	11	333	244	9.60	0.00	0.00	0.15	0.00
Pump, Poplar Hill.....	"	11	334	420	71.40	0.04	0.06	0.40	0.00

TABLE No. 6—Continued.

TAPS, STREAMS OR WELLS.	Date.	Laboratory Number.	Total Solids.	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Nitrates.	Nitrites.	Conditions.
Spring, No. 2715 West North avenue.....	" 12	335	270	16.50	0.00	0.00	0.00	0.00	Good.
No. 71, Thomas Weeks.....	" 11	336	120	6.00	0.15	0.33	1.55	0.00	Bad.
No. 72, G. G. Armour.....	" 11	337	130	5.20	0.20	0.40	2.18	0.00	Bad.
No. 73, W. H. Dinfenderfer.....	" 11	338	124	7.00	0.18	0.40	1.00	0.00	Bad.
No. 74, West Arlington, S. P.....	" 11	339	90	4.20	0.20	0.16	0.55	0.00	Bad.
H. water, No. 280 West Baltimore street.	" 19	340	124	7.00	0.43	0.87	0.00	0.00	Bad.
S. P., Arlington Tap.....	" 19	341	120	5.16	0.00	0.00	0.00	0.00	Good.
Western Pump House.....	" 19	342	110	5.10	0.02	0.00	0.00	0.00	Good.
High Service, Druid Hill Park.....	" 19	343	108	4.95	0.00	0.00	0.00	0.00	Good.
Druid Hill Lake.....	" 19	344	114	5.40	0.00	0.00	0.00	0.00	Good.
Lake Roland, Towson Br.....	" 19	345	118	5.92	0.05	0.11	0.65	0.00	Bad.
S. P., Arlington Bottom.....	" 19	346	152	9.08	0.02	0.07	0.10	0.00	Fair.
Jones' Falls, G. S. Bridge.....	" 19	347	105	7.10	0.00	0.00	0.00	0.00	Good.
Pump House, L. R.....	" 19	348	144	6.40	0.10	0.05	0.80	0.00	Bad.
Br., from Lake Side, L. R.....	" 19	349	83	8.05	0.00	0.00	0.40	0.00	Good.
Conduit Gate House, L. R.....	" 19	350	159	7.00	0.15	0.18	1.15	0.00	Bad.
Middle Lake Roland.....	" 19	351	214	6.14	0.35	0.20	1.16	0.00	Bad.
Pump, 31st st. and Remington ave.....	" 22	352	.....	40.16	0.45	0.87	0.05	trace	Bad.
Cottage avenue, Warfield.....	" 29	353	100	11.06	0.04	0.60	0.14	0.00	Good.
Pump, No. 722 York road.....	Sept. 5	354	194	10.65	0.00	0.00	0.13	0.00	Good.
Pump, No. 3210 Cedar avenue.....	" 14	355	940	151.10	1.15	0.57	0.19	0.05	Bad.
Pump, No. 3441 Chestnut avenue.....	" 14	356	374	68.10	0.00	0.00	0.10	0.00	Fair.
City Water Lab. Tap.....	" 25	357	90	8.14	0.02	0.07	0.04	0.00	Fair.

Pump, 1st T. G., Liberty road.....	Oct. 31	358	756	94.50	0.05	0.09	0.11	0.09	Rad.
Pump, 9th and Pressbury streets.....	" 31	359	149	5.10	0.02	0.05	0.00	0.00	Good.
Pump, Clifton avenue extended.....	" 31	360	120	9.16	trace	0.07	0.09	traces	Suspicious
Pump, North avenue and 11th street..	" 31	361	270	30.00	0.00	0.00	0.00	0.00	Good.
Hydrant, No. 1228 East North avenue..	Nov. 29	362	84	6.15	0.00	0.04	0.12	trace	.....
Hydrant, Park avenue.....	" 29	363	80	4.29	0.00	0.00	0.09	trace	.....
Pump, Riggs avenue extended.....	" 29	364	344	32.18	0.00	0.05	0.15	trace	Suspicious.
Pump, Riggs avenue extended.....	" 29	365	810	75.10	0.00	0.15	0.65	0.05	Bad.
Pump, Riggs avenue extended.....	" 29	366	806	213.50	0.14	0.26	0.25	0.04	Bad.
Pump, Riggs avenue extended.....	" 29	367	890	67.75	0.00	0.00	0.05	0.00	Fair.
Pump, Riggs avenue extended.....	" 29	368	450	93.75	0.00	0.00	0.18	0.00	Suspicious.
Pump, Riggs avenue extended.....	" 29	369	120	16.00	0.00	0.00	0.05	0.00	Good.
Lab. Tap., City Water.....	Dec. 5	370	103	3.82	0.02	0.05	0.14	traces	Bad.

TABLE No. 6.—Continued.

PUMPS, WELLS, SPRINGS.	Date.	Laboratory Number.	Total Solids.	Volatile Solids.	Mineral Solids.	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Nitrates.	Nitrites.	Condition.
Pump—2508 Mosher street, extended.	1900.	381	301	204	61	59.20	.....	.....	0.90	.....	Suspicious.
2516-18 Mosher st., extended.	"	12	382	684	460	224	143.0	0.06	0.14	.....	Bad.
2534 Mosher street, extended.	"	12	383	562	350	212	82.50	0.05	0.09	.....	Bad.
Mrs. Ray, Riggs ave., ext....	"	12	384	151	99	52	29.0	.....	0.61	.....	Good.
Mrs. C. Flanagan, Riggs ave.	"	12	885	160	41	119	33.0	.....	0.53	.....	Suspicious.
1007 2d st., N. W. Annex.	"	12	386	160	76	84	23.60	.....	.....	.....	Fairly good.
Bull Mansion, Whitehurst...	"	29	387	261	192	69	50.26	.....	0.54	.....	Fair.
2402 Riggs avenue.....	"	31	388	336	100	236	78.0	0.02	0.06	.....	Suspicious.
2542 Mosher street.....	"	81	389	704	541	163	165.0	traces.	0.07	16.20	Bad.
1 Third street, extended....	"	81	390	360	220	140	56.50	.....	3.54	.....	Suspicious.
5 Third avenue.....	"	31	891	190	136	54	18.20	.....	2.51	.....	Fair.
13 Third avenue.....	"	31	392	340	190	150	55.40	.....	4.21	.....	Fair.
1104 Third avenue.....	"	31	393	130	70	60	34.20	.....	.....	.....	Good.
2800 Lafayette avenue.....	"	31	394	251	158	93	43.20	.....	0.40	.....	Fair.
1022 Bloomingdale road...	"	31	395	407	271	136	75.50	.....	0.78	.....	Suspicious.
Purnell, Bloomingdale road...	"	31	396	304	186	118	49.50	0.08	0.22	.....	Bad.
Perry, Bloomingdale road...	"	31	397	260	110	150	19.0	.....	0.65	.....	Good.
Brayshaw, Franklin road...	April	25	398	326	210	116	38.16	0.06	0.09	12.40	traces.
Williamson, Franklin road...	"	25	399	920	616	304	118.0	0.06	0.14	34.16	Bad.
Tyler, Franklin road.....	"	25	400	62	38	25	2.41	0.09	0.07	.....	Fair.
Gerkin, Franklin road.....	"	25	401	714	432	282	91.45	0.02	0.06	41.25	Bad.
Cross, Riggs avenue, ext....	"	27	402	572	443	120	171.0	0.07	0.14	64.25	Bad.

Pump—2508 Mosher street.....	April	27	403	364	313	91	64	20	.....	0.19	39	50	.....	Bad.
2534 Mosher street.....	"	27	404	580	382	198	91	20	.....	0.02	0.12	40	45	Bad.
Flanagan, Riggs avenue, ext.....	"	27	405	156	49	107	81	55	.....	0.05	0.09	16	90	Bad.
2542 Mosher street.....	"	27	406	719	561	168	181	.....	.....	0.10	44	50	.....	Bad.
Ninth and Pressbury sts.....	May	7	407	164	85	79	9	10	.....	0.03	0.04	.....	.....	Good.
1022 Bloomingdale road.....	"	7	408	419	291	138	72	14	.....	.....	0.06	24	60	present
Clifton avenue, ext.....	"	7	409	127	43	84	16	40	.....	0.04	0.16	.....	.....	Bad.
White, North avenue, ext.....	"	7	410	284	179	105	11	14	.....	0.06	0.08	.....	.....	Bad.
Nixon, Franklin road.....	"	18	411	512	336	176	63	15	.....	0.15	0.27	14	50	present
849 Franklin road.....	"	18	412	354	242	112	55	16	.....	0.08	0.10	15	20	Bad.
Busby, Franklin road.....	"	18	413	784	380	384	148	50	.....	0.35	0.55	9	10	Bad.
McCormick, Franklin road.....	"	18	414	382	200	182	87	0	.....	traces	0.06	0.55	.....	Fairly good
812 Franklin road.....	"	18	415	500	160	340	106	0	.....	.....	0.09	.....	.....	Bad.
Sharet's, Easter lane.....	June	5	417	216	138	78	59	55	.....	.....	15	45	.....	trace
Lutz, Easter lane.....	"	5	418	644	282	262	1	80	.....	0.05	0.11	12	0	.....
Workinger, Easter lane.....	"	5	419	234	160	74	83	50	.....	.....	11	0	.....	trace
Quick, Easter lane.....	"	5	420	566	344	212	153	0	.....	0.04	0.07	14	0	present
Mitchell, Liberty road.....	"	5	421	206	160	46	125	0	.....	.....	18	0	.....	Bad.
2800 Lafayette avenue.....	"	5	422	242	172	70	104	50	.....	trace	0.07	16	24	present
Quarantine.....	"	19	423	142	81	61	11	0	.....	trace	0.02	.....	.....	Good.
Spring—Quarantine.....	"	19	424	142	81	61	11	0	.....	trace	0.02	.....	.....	Good.
Pump—Hartman, Easter lane.....	"	19	425	286	172	114	106	60	.....	.....	6	00	.....	trace
Abraham's, Easter lane.....	"	19	426	872	198	174	85	20	.....	.....	9	0	.....	Suspicious.
No. 1 Purnell.....	"	19	429	360	174	186	114	60	.....	0.30	0.70	14	0	.....
No. 2 Purnell.....	"	25	430	332	166	166	108	0	.....	0.23	0.45	12	0	.....
127 Brady avenue, Waverly.....	July	12	482	.....	.....	215	70	.....	.....	0.12	3	00	.....	present
Collier, Reisterstown road.....	"	16	433	552	278	274	139	90	.....	0.02	0.21	3	00	.....
Reed, Reisterstown road.....	"	16	434	202	76	126	31	0	.....	0.02	.....	2	00	.....
Schaeffer, Reisterstown road.....	"	16	435	276	102	174	57	60	.....	0.10	5	00	.....	Fair.
Fix, Reisterstown road.....	"	18	436	340	148	192	91	00	.....	0.08	0.19	6	00	Suspicious.
Disney, Reisterstown road.....	"	18	437	370	180	190	103	50	.....	0.09	6	00	.....	Bad.
Carey, Clifton avenue.....	"	19	438	104	39	65	15	60	.....	.....	.....	.....	.....	Good.
Penhurst and Eldorado aves.....	"	19	439	164	38	126	11	90	.....	0.02	.....	.....	.....	Good.
2852 Pennsylvania avenue.....	"	19	440	108	72	36	17	80	.....	0.03	.....	.....	.....	Good.



TABLE No. 6—Continued.

PUMPS, WELLS, SPRINGS.	Date.	Laboratory Number.	Total Solids.	Volatile Solids.	Mineral Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates.	Nitrites.	Conditions.
Pump—Murphy, Irvington .....	1900.										
Odenwald, Irvington .....	July 21	441	164	102	62	26.50	.....	.....	9.00	.....	Good.
Keefe's spring, Irvington .....	" 21	442	132	80	52	27.80	.....	0.03	6.00	.....	Fair.
Well—13 S. Frederick street .....	" 21	443	144	58	86	20.00	.....	0.05	.....	.....	Good.
Spring—Fresh Air Society .....	" 24	444	442	242	200	219.10	12.80	.....	11.00	.....	Bad.
Pump—Phillips, Hillen road. ....	" 24	445	100	56	44	21.50	.....	.....	.....	.....	Good.
121 Brady avenue .....	Aug. 1	448	245	168	75	77.80	.....	0.15	11.00	.....	Bad.
Yeakle, N. Walbrook .....	" 31	451	.....	.....	89	19.40	present	.....	7.00	.....	Bad.
Gwynn Oak .....	" 31	451	.....	.....	.....	28.00	.....	.....	.....	.....	Good.
Campbell, Harford rd—house .....	Sept. 10	452	330	240	90	2.30	0.50	1.20	0.50	.....	Bad.
Campbell, Harford rd—stable .....	" 10	454	64	40	24	20.00	0.00	.....	0.50	.....	Fairly good
Well—Quarantine, No. 1 .....	" 10	455	.....	.....	.....	43.00	.....	0.04	4.00	present	Bad.
Quarantine, No. 2 .....	Oct. 16	456	30	14	16	8.00	0.50	0.60	.....	.....	Good.
Pump—Bosworth, Hoffman lane ...	" 16	457	30	12	18	7.80	0.04	0.05	.....	.....	Good.
	Nov. 17	459	142	89	53	13.50	0.14	0.29	.....	.....	Bad.

TABLE No. 6.—Continued.

NAME AND LOCALITY.	Condition.	Total Solids.	Volatile Solids.	Mineral Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates.	Nitrites.	Sulphates as S. O. <sub>3</sub>	Required Oxygen.	Character.
C. E. Wooden, 214 Cold Spring lane...	Clear Odorless Neutral	212	132	80	33.50	0.00	0.09	4.00	0.00	0.55	1.86	Bad.
Richard Beeler, Shirley lane, Reisters-town road. ....	Clear Odorless Neutral	458	200	258	163.00	0.02	0.09	5.00	0.00	16.00	3.49	Bad.
Wm. Breckenridge, Shirley lane. ....	Cloudy Odorless Neutral	114	46	68	7.50	0.05	0.16	0.00	0.00	0.00	1.51	Fair.
G. W. Gail, Pimlico road. ....	Clear Odorless Neutral	260	106	154	48.00	0.00	0.08	0.00	0.00	0.00	0.95	Bad.
Daniel H. Whitney, Shirley lane. ....	Cloudy Odorless Neutral	280	150	130	163.00	0.02	0.06	4.00	0.00	9.00	2.10	Bad.
Wm. Ludwig, Shirley lane. ....	Clear Odorless Neutral	220	74	146	37	0.00	0.05	0.00	0.00	0.00	0.73	Fair.
E. C. Bosworth, Hoffman lane, east of Carroll .....	Clear Odorless Neutral	310	202	108	127	0.06	0.18	20.06	0.00	0.00	3.20	Bad.
Quarantine, artesian well. ....	Clear Odorless Neutral	54	6	48	4.50	0.00	0.00	0.00	0.00	0.00	0.18	Very good

TABLE No. 6—Continued.

NAME AND LOCALITY.	Condition.	Total Solids.	Volatile Solids.	Mineral Solids.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.	Nitrates.	Nitrites.	Sulphates as S. O. <sub>2</sub>	Required Oxygen.	Character.
J. S. Spence, 1022 Bloomingdale road	Clear Odorless Sl. Acid	384	230	154	59	0.20	0.34	9.00	Pres't	0.00	.....	Bad.
Lydecker's pump...	Clear Odorless Neutral	126	94	32	10.10	0.00	0.06	0.00	0.00	0.00	.....	Fair.
Dieterich's pump...	Clear Odorless Sl. Acid	566	500	66	117.10	0.11	0.14	21.99	Pres't	0.60	.....	Very bad.
Owen's Distillery pump.....	Very cloudy Odorless Acid	810	614	196	174.40	0.06	0.18	0.00	Pres't	0.00	.....	Very bad.
Catonsville water, Irrington.. ..	Very cloudy Odorless Neutral	192	50	142	4.50	0.04	0.15	0.00	0.00	0.00	.....	Good.

TABLE No. 6—Concluded.

LOCATION.	Sample Taken.	Total Solids.	Volatile Solids.	Mineral Solids.	Chlorine.	Free Ammonia.	Nitrites.
Light street bridge (at foot of bridge) .....	P. M.	8455	594	2861	1490	Abundant.	0.009
	A. M.	9414	1619	7795	4060	"	0.015
Light street bridge (at draw bridge).....	P. M.	9183	1579	7604	3960	"	0.013
	A. M.	10064	1730	8334	4340	"	0.010
Fort McHenry (at water front).....	P. M.	5356	921	4485	2310	"	0.010
	A. M.	10898	1874	9024	4700	"	0.009
Fort McHenry (60 feet from water front).....	P. M.	6608	1136	5472	2850	"	0.015
	A. M.	11733	2017	9716	5060	"	0.008
Public baths (at water front) .....	P. M.	4081	702	3379	1760	"	0.031
	A. M.	9822	1603	7719	4020	"	0.024
Public baths (60 feet from water front) .....	P. M.	4521	778	3743	1950	"	0.027
	A. M.	10713	1842	8871	4620	"	0.019

Note.—The sample in every case was more or less muddy, and possessed a musty odor.

## Report of Division of Plumbing and Drainage.

BALTIMORE, MD., January 1, 1903.

JAMES BOSLEY, M. D., *Commissioner of Health*:

DEAR SIR—I have the honor to submit my report of the Division of Plumbing and Drainage for the year ended December 31, 1902. The appended statement will show the number of permits issued, and the inspections made:

Number of permits for plumbing .....	2,014
“ “ to drain closets .....	2 126
“ inspections of plumbing.....	705
“ sanitary inspections .....	612
“ applications approved from City Engineer's office .....	823
“ notices to abate nuisances.....	178

Respectfully submitted,

JOSEPH C. MITCHELL,  
*Superintendent.*

## Report of Throat Inspector.

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BALTIMORE, MD., January 1, 1903.

JAMES BOSLEY, M. D., *Commissioner of Health:*

DEAR SIR—I have the honor to herewith submit a report of work done during the year 1902.

Number of cultures taken.....	1,905
Negative .....	1,808
Positive.....	97
Number of houses visited.....	782
Positive (without showing clinical diphtheria).....	36

Respectfully,

ALAN W. SMITH,  
*Throat Inspector.*

## Report of Inspectors of Food.

JAMES BOSLEY, M. D., *Commissioner of Health:*

DEAR SIR—We have the honor to report that during the year ended December 31, 1902, we made the following inspections and condemnations of foods:

MONTHS.	Store.	Markets.	Slaughter house.	Abattoirs.	Fruits and Vegetables.	Meats.
January .....	1,062	111	65	77	.....	6,398
February .....	1,041	109	51	74	.....	7,634
March .....	1,041	109	51	74	3,150	6,909
April .....	913	104	51	71	1,200	5,326
May .....	1,073	110	60	76	4,535	6,341
June .....	1,094	118	40	83	5,646	9,278
July .....	947	118	42	124	42,770	14,582
August .....	1,054	110	40	107	7,350	13,450
September.....	1,054	110	40	107	2,950	7,466
October .....	971	117	35	114	2,150	9,241
November .....	971	117	35	114	3,700	15,538
December .....	971	117	35	114	.....	10,685
Total .....	12,173	1,345	545	1,135	73,451	112,848

Respectfully submitted,

CHARLES KNELL,  
WILLIAM B. ROTH,  
C. M. BRODWATER,  
C. A. LERIAN,  
*Food Inspectors.*

## Report of the Nuisance Clerk.

BALTIMORE, MD., December 31, 1902.

JAMES BOSLEY, M. D., *Commissioner of Health*:

DEAR SIR—Please find report of work done in this department for the year 1902.

1902.	Permits to clean privies.	Number of loads to Foley's dump.	Number of loads to Winan's dump.	Number of loads to both dumps.
January .....	4,327	1,081	4,946	6,027
February .....	1,943	414	1,937	2,351
March .....	10,168	.....	7,651	7,651
April .....	11,756	.....	11,295	11,295
May .....	10,118	.....	11,049	11,049
June .....	8,101	.....	7,880	7,880
July .....	5,948	.....	6,842	6,842
August .....	4,229	.....	5,451	5,451
September .....	3,547	.....	4,861	4,861
October .....	3,261	.....	4,376	4,376
November .....	2,749	.....	3,664	3,664
December .....	2,247	.....	3,212	3,212
Total .....	68,394	1,495	73,164	74,659

There has been only one dump for reception of night soil since March 1, 1902.

Number of persons presented for violation of Section 101 Article 23

Baltimore City Code ..... 2

Number of books disinfected..... 97

Respectfully,

F. X. JENKINS,  
Nuisance Clerk.



## Report of the Inspector of Bakeries.

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BALTIMORE, January 1, 1903.

JAMES BOSLEY, M. D., *Commissioner of Health:*

DEAR SIR—I have the honor to report that during the year ended December 31, 1902, I inspected 3,144 bakeries, and ordered 141 of them to be cleaned.

Respectfully submitted,

HENRY J. HAHN,  
*Inspector of Bakeries.*

# Report of the Keeper of the Morgue.

BALTIMORE, January 1, 1903.

*To the Commissioner of Health:*

Report for the year 1902 of the City Morgue:

Number of bodies received.....	262
White.....	159
Blacks.....	109
Males.....	212
Females.....	50

Ages from 1 day to 1 year.....	9
1 year " 10 ".....	8
11 " " 20 ".....	16
21 " " 30 ".....	62
31 " " 40 ".....	52
41 " " 50 ".....	59
51 " " 60 ".....	31
61 " " 70 ".....	18
71 " " 80 ".....	2

## CAUSES OF DEATH.

Apoplexy.....	15	Nephritis.....	3
Fracture skull.....	5	Tuberculosis.....	14
Consumption.....	8	Toxaemia.....	1
Pneumonia.....	9	Menningitis.....	1
Accident.....	11	Suffocation.....	2
Gunshot wound.....	12	Aunerism of Arta.....	1
Typhoid fever.....	6	Peritonitis.....	4
Bright's disease.....	7	Suicide.....	10
Drowned.....	37	Poison.....	3
Arteros Sclerosis.....	1	Cut by knife.....	1
Rheumatism.....	2	Calangitis.....	1
Heart failure.....	13	Cardia failure.....	3
Burns.....	4	Heat stroke.....	1
Phthisis.....	4	Lockjaw.....	1
Exposure.....	2	Diarrhoea.....	2
Struck by cars.....	13	Cholera Infantum.....	1
Hemorrhage.....	6	Asthenia.....	2
Convulsions.....	1	Congestion of lungs.....	2
Asphyxia.....	6	Shock.....	2
Sencope.....	2	Cancer.....	1
Heart disease.....	6	Paralysis.....	2
Asthma.....	6	Rupture of liver.....	1
Exhaustion.....	8	Inanition.....	1
Alcoholism.....	2	Still births.....	13

Bodies buried by friends.....	157
Bodies buried by city.....	109
Bodies now at the Morgue.....	8
Post mortems by Dr. N. G. Keirle, M. D.....	38

PATRICK R. GLYNN,  
*Superintendent.*

## Report of the Commissioner's Clerk.

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BALTIMORE, January 1, 1903.

JAMES BOSLEY, M. D., *Commissioner of Health:*

DEAR SIR—I have the honor to submit herewith an account of the work done by me during the year ended December 31, 1902:

Number of letters sent out .....	2,516
Number of notices sent to physicians.....	2,250
Number of notices sent to undertakers.....	140
Number of notices sent to hospitals.....	52
Number of notices sent to hotels .....	125
Number of notices sent to public schools.....	10,000
Number of notices sent to parochial schools.....	4,800
Number of notices sent to private schools.....	800
Number of notices sent to dispensaries.....	1,000
Total.....	<u>21,683</u>

Number of culture tubes delivered to city stations ... 7,560

Respectfully submitted.

ELEAZER GOLDBERG,  
*Commissioner's Clerk.*

## Report of the Inspector of Dairies.

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BALTIMORE, January 1, 1902.

JAMES BOSLEY, M. D., *Commissioner of Health*:

DEAR SIR—I have the honor to submit my annual report for the year ended December 31, 1902; at the beginning of the year I found on inspection that there were 394 stables within the city limits housing cows for private use, and for dairy purposes.

During the year 107 dairymen sold their cows and discontinued business, leaving 287 stables at the end of the year. There are ten dealers in Milch cows in the city.

I am pleased to say that there seems to be a general disposition on the part of the dairymen to comply with the regulation of this department, but I found it necessary to cause the arrest of three dairymen for failure to comply with the regulation, two of whom were fined, while one was released by the magistrate on his promise to comply in the future with the regulation.

I condemned five cows and had them removed from stable. During the year I gathered fifty samples of milk for analysis in laboratories. My inspections included 3,031 visits to stables and 16,204 examinations of cows.

Respectfully submitted.

GEO. F. SCHULTZ,  
*Inspector of Dairies.*

## Report of the Index Clerk. .

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### HEALTH DEPARTMENT.

DIVISION COMPLAINTS OF NUISANCES; FUMIGATIONS; FOOD AND GUARD  
EXPENSES; AND THE PAUPER-DEAD.

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BALTIMORE, January 1, 1903.

JAMES BOSLEY, M. D.,

*Commissioner of Health of Baltimore City:*

SIR—I herewith most respectfully submit a report for the year ending December 31, 1902, of that division of your department in my charge, including all direct complaints of nuisances in a tabulated form, classified by wards, showing an increase in number of 925 over 1901; a table of fumigation, and their results, classified by both streets and diseases; statement of the costs of food, and guard service in cases of infectious and contagious diseases, all of which I hope will satisfactorily explain themselves, in comparison with the year preceding.

I also annex a full statement of all smallpox cases, including, in addition to those sent to the Quarantine station, a list of suspects, held during the year at the Detention Hospital; lists of clothing, etc., fumigated and destroyed, together with a detailed report of the pauper-dead, and other bodies that have come under your care and control, and the disposition of the same. There is a complete record in this division covering all possibly ascertainable facts in each and every case. The tables show where they came from, their disposition, also the names and places of burial of those reclaimed by families, friends or associations for private burial, after having come into your custody under the law

for pauper burial; number buried in Potter's Field, and the number turned over to the Board of Anatomy for scientific purposes in compliance with law. The comparative coffin account will show the saving in cost for the past two years of \$1,088.31 over the year 1900, notwithstanding the fact that the cost as shown for 1902 leaves the Department with a sufficient number of coffins to meet our requirements until June 30, 1903.

In addition to the above I will state that the custom of the Department in the past was to furnish all guards meals and car tickets. Your new rule to furnish meals *alone* to smallpox guards, and only car tickets to diphtheria and scarlet fever guards, has resulted this year in reducing these expenses \$125.55, viz: in meals \$98.25 and \$27.30 in car tickets, which with the coffin curtailment has made a total reduction of \$1,213.86, not to speak of a material reduction in food costs over previous years.

COMPLAINTS CLASSIFIED BY WARDS FOR THE YEAR 1902.

Complaints.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Totals
Alleys .....	6	5	13	45	27	12	11	52	12	13	41	37	22	46	16	35	18	41	21	29	6	10	9	7	534
Cellars .....	9	16	52	36	66	24	26	56	13	24	29	34	23	27	39	19	12	41	45	10	38	54	9	17	719
Drainage .....	7	...	...	7	2	3	1	5	6	3	2	6	2	11	15	8	3	2	2	2	1	...	3	3	91
Filth .....	7	4	9	38	30	6	4	22	5	...	17	3	4	16	12	8	3	15	8	2	8	12	5	2	240
Gutters .....	2	3	6	5	3	2	...	6	...	2	4	6	1	4	11	...	2	4	3	3	1	1	2	1	72
Garbage .....	2	5	...	9	4	4	1	4	1	...	...	4	...	...	2	2	...	...	3	1	1	1	1	3	48
Gas .....	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	2	...	...	...	...	3
Grass .....	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1
Hydrants .....	...	1	...	...	1	2	4	...	...	5	...	1	...	...	8	...	...	2	...	...	...	1	1	...	25
Ice .....	2	...	1	1	7	1	1	2	2	2	1	8	4	7	13	2	...	2	3	1	2	1	2	2	66
Lot's .....	...	...	...	3	1	1	1	...	2	...	8	4	1	3	...	3	6	...	1	2	1	2	2	2	38
Manure .....	17	16	27	65	36	13	13	14	11	20	28	18	15	36	37	25	20	23	28	19	10	19	10	14	534
Nuisances .....	32	64	137	159	182	90	101	129	72	86	142	125	69	124	168	205	96	88	144	49	28	54	26	25	2395
Privies .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	...	1	...	2	...	...	...	4
Roofs .....	...	2	...	2	...	...	3	4	7	1	...	...	2	...	...	1	5	...	2	...	2	...	...	...	31
Spouts .....	1	1	...	4	3	...	...	...	...	2	1	5	10	2	...	...	...	1	...	...	...	3	2	6	41
Sewers .....	1	2	2	2	1	1	1	...	1	...	3	3	1	1	6	1	...	2	...	2	2	1	2	...	34
Streets .....	1	...	...	1	...	1	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8
Sidewalks .....	5	...	2	2	2	3	2	2	2	4	5	1	1	2	...	...	1	3	2	1	...	1	1	3	45
Stables .....	1	...	4	...	6	...	2	4	1	3	8	5	1	3	9	8	...	2	1	...	10	3	2	2	75
Stagnant Water .....	1	...	1	1	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	5
Paving .....	...	1	...	...	4	...	...	...	...	...	2	...	...	...	...	1	...	...	...	...	...	...	...	...	18
Pipes .....	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	1	2	...	...	1	3	1	1	...	120
Water .....	4	7	8	16	8	3	4	6	4	...	8	6	2	7	8	6	3	2	7	3	...	6	2	1	245
Yards .....	10	2	10	31	20	3	7	17	13	10	15	7	11	14	9	11	11	15	15	3	6	1	...	4	...
Totals .....	107	129	271	422	403	109	181	324	156	175	309	280	170	303	357	337	181	243	286	129	119	174	80	89	5394

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
Ann.....	5			5
Arlington avenue.....	1		2	3
Aliceanna.....	8			8
Albemarle.....	4	5		9
Aisquith.....	8	11		19
Ashland avenue.....	4	6	1	11
Argyle avenue.....	1	1		2
Anthony.....		1		1
Appleton.....	1			1
Addison alley.....	2			2
Augusta avenue.....	1			1
Bank.....	4	2	1	7
Bernard.....	1			1
Broadway.....	7	6		13
Brunswick.....	1			1
Brick Hill.....			1	1
Bond.....	9	6		15
Belair avenue.....	2			2
Baltimore.....	9	5	5	19
Bolton.....	1	2	1	4
Bloomsbury.....	3			3
Bradford.....	5	3		8
Bruce.....	2			2
Baker.....	3	3		6
Barney.....	2			2
Barclay.....	5	3	1	9
Bloomingtondale road.....	1	1	1	3
Biddle.....		2	6	8
Bethel.....	5	1		6
Barre.....	8			3
Belt avenue.....	1			1
Brunt.....	1			1
Bowen.....	2			2
Battery avenue.....	2			2
Bokee.....		3		3
Barnes.....		1		1
Brown's lane.....	1			1
Bohemia Court.....	1			1
Chase.....	2	2		4
Cathedral.....		1		1
Charles.....	4	9	3	16
Central avenue.....	3	3	1	7
<i>Carried forward</i> .....	115	77	23	215



## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	115	77	23	215
Chapel .....	6	2	2	10
Cross .....	1	1	2	3
Calvert .....	6	3	8	12
Church .....	2	.....	.....	2
Carrollton avenue .....	8	.....	1	4
Clifton .....	.....	3	.....	3
Caroline .....	7	6	2	15
Calhoun .....	1	1	.....	2
Carey .....	2	2	1	5
Canton avenue .....	8	.....	.....	8
Collington avenue .....	3	1	.....	4
Chester .....	8	3	.....	11
Colvin .....	.....	2	.....	2
Chestnut avenue .....	4	1	1	6
China alley .....	1	.....	.....	1
Conway .....	1	1	1	3
Cedar avenue .....	12	.....	.....	12
Courtney .....	.....	.....	1	1
Curley .....	1	.....	.....	1
Constitution .....	.....	.....	1	1
Castle .....	1	1	.....	2
Crystal avenue .....	.....	1	.....	1
Clifford .....	2	.....	.....	2
Cemetery lane .....	.....	1	.....	1
Camden .....	4	1	.....	5
Clipper avenue .....	1	.....	.....	1
Chesapeake .....	2	.....	.....	2
Columbia avenue .....	2	1	1	4
Christian .....	1	.....	.....	1
Cambridge .....	1	.....	.....	1
Covington .....	3	1	.....	4
Cannon .....	5	.....	.....	5
Carlyle place .....	1	.....	.....	1
Cole .....	1	.....	.....	1
Carroll .....	2	.....	.....	2
Callow .....	.....	1	.....	1
Coke .....	.....	.....	1	1
Clement .....	1	.....	1	2
Durham .....	9	2	2	13
Druid Hill avenue .....	4	1	2	7
Decatur .....	1	.....	.....	1
<i>Carried forward</i> .....	221	113	45	379

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	221	113	45	397
Dallas.....	7			7
Donnelly Court.....	1			1
David avenue.....	2			2
Delwood avenue.....	1			1
Division.....	1			1
Dorsey lane.....		1		1
Durst.....	1			1
Duncan alley.....	1			1
Eastern avenue.....	9	1		10
Edmondson avenue.....	3	6		9
Exeter.....	5	11		16
Evergreen Terrace.....	1			1
Eager.....	2	4		6
Eutaw Place.....	2	1	3	6
Eutaw street.....	2	1	2	5
Eden.....	2	6	1	9
East avenue.....	2			2
Ellicott.....			1	1
Essex.....	1			1
Ensor.....		2		2
Elm.....	4			4
Edgar Place.....	2			2
Franklin.....	6	3	2	11
Frederick avenue.....	7	1	1	9
Fayette.....	10	16	4	30
Fifth avenue.....	1		1	2
Fulton avenue.....	11	2	2	15
Francis.....		1		1
Forrest Park.....		1		1
First avenue.....	1			1
Fort avenue.....	3	3		6
Falls road.....	4	2		6
Forrest.....	3	2		5
Fremont avenue.....	2	2		4
Fawn.....	3	5		8
Federal.....	2	3		5
Front.....	6	5		11
Fairmount avenue.....	4	1	1	6
Fell.....	3			3
Fait.....	2			2
<i>Carried forward</i> .....	337	193	68	512

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	337	193	68	512
Franklin Terrace.....			1	1
Fourth avenue.....	1			1
Foster.....	1			1
Gay.....	3	9		12
Gough.....	6	1	1	8
George.....		1		1
Gallagher's Court.....	1			1
Gilmor.....	3	6		9
German.....	1			1
Greene.....			1	1
Greenmount avenue.....	2	2		4
Granby.....	5	1		6
Gorsuch.....	1	1		2
Gutman avenue.....	1			1
Gold.....		1		1
Girard avenue.....			1	1
Grindall.....	1			1
Hamburg.....	5	1		6
Hopkins avenue.....	1		1	2
Hamilton.....	2			2
Howard.....	4			4
Henrietta.....	1			1
Harrison.....	3	3		6
Harlem avenue.....	3	3	3	9
Hoffman.....	4	2		6
Holbrook.....	4	4		8
Hakesley.....	1	1		2
Hughes.....		1		1
Hickory avenue.....	3			3
Hillen.....	2	1		3
Hudson.....	4			4
High.....	8	11	1	20
Harford road.....	1	1		2
Huntingdon avenue.....	6			6
Hampden avenue.....	1			1
Haw.....	2			2
Hanover.....	1	1	1	3
Harris alley.....	4			4
Homewood avenue.....	1			1
Hooper avenue.....	2			2
<i>Carried forward</i> .....	426	244	73	668

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	426	244	73	668
Hill.....		2		2
Hare.....	1			1
Henry.....	1			1
Jefferson.....	4	2		6
Jenkins alley.....	1			1
Jackson Square.....	3	1		4
Keyser.....		1	1	2
Kossuth.....			1	1
Leadenhall.....	1			1
Lehman.....	3	1		4
Lanvale.....	5	6	2	13
Low.....	5	5		10
Lamley.....	8			3
Linden avenue.....	4		1	5
Landwehr's lane.....	1			1
Lafayette avenue.....	11	3		14
Lexington.....	2	2		4
Light.....	2	2		4
Leloup.....	2			2
Liberty road.....		1		1
Little Church.....			1	1
Lombard.....	15	5	3	23
Lemon.....	1	1		2
Luzerne.....	1	3	2	6
Lee.....	4			4
Laurens.....	1	2		3
Lakewood avenue.....	1			1
Loudon avenue.....	3	1		4
Monument.....	3	2	1	6
Madison.....	1	8	2	11
McDonough.....	1			1
McCulloh.....	2	1	1	4
Milliman.....	2	1		3
Mulberry.....	4	4		8
Montford avenue.....	7			7
Marshall.....	2			2
Maryland University.....			1	1
Myrtle.....		1		1
Marsh Market Space.....	2			2
Monroe.....	5	2	1	8
Milton avenue.....	2	4		6
<i>Carried forward</i> .....	532	306	90	852

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	582	306	90	852
Maryland avenue .....	1	2	.....	3
Monmonier court .....	2	.....	.....	2
Mason's alley .....	1	.....	.....	1
Mt. Royal avenue .....	2	1	8	6
Mosher .....	2	1	.....	8
Medairy .....	2	1	.....	3
Mount .....	1	2	.....	3
Madison avenue.....	1	1	1	3
Morris .....	1	.....	.....	1
Mullikin .....	1	.....	.....	1
Maldeis .....	2	.....	.....	2
Maempel lane.....	1	.....	.....	1
Marriott .....	2	.....	.....	2
Moyer .....	1	.....	.....	1
McHenry .....	2	2	.....	4
McElderry .....	2	4	2	6
McMechen.....	.....	1	.....	1
McKim .....	1	.....	.....	1
Mura .....	1	1	.....	2
North avenue.....	6	5	2	13
Newington avenue .....	2	2	.....	4
Oxford avenue .....	2	.....	.....	2
Oak .....	2	.....	.....	2
Old Frederick road.....	1	.....	.....	1
Oliver .....	.....	1	.....	1
Orchard .....	3	.....	.....	3
Orleans .....	1	1	.....	2
O'Donnell .....	1	.....	.....	1
Ostend .....	.....	1	.....	1
Park avenue.....	3	2	2	7
Paca .....	4	1	.....	5
Patterson Park avenue.....	13	3	.....	16
Preston .....	4	3	.....	7
Pratt .....	6	7	.....	13
Pennsylvania avenue.....	4	4	1	9
Pentland place .....	1	.....	.....	1
Pleasant alley.....	2	1	1	4
Pitcher.....	.....	3	.....	3
Pulaski .....	2	.....	.....	2
Poppleton .....	2	.....	.....	2
Parrish alley.....	1	1	.....	2
<i>Carried forward</i> .....	618	357	102	1,000

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	618	357	102	1,000
Pierce .....	1	.....	2	3
Presstman .....	2	.....	1	3
Parkwood avenue.....	1	1	.....	2
Peabody.....	1	.....	.....	1
Port.....	2	.....	.....	2
Pinkney.....	1	.....	.....	1
Portland.....	1	.....	.....	1
Payson .....	.....	1	.....	1
Patapsco .....	2	.....	.....	2
Parkin .....	1	.....	.....	1
Peach alley.....	.....	1	.....	1
Penhurst .....	1	.....	.....	1
Plymouth .....	1	.....	.....	1
Ramsay .....	6	.....	.....	6
Register .....	2	2	.....	4
Rose .....	3	1	.....	4
Ridgewood avenue .....	1	.....	.....	1
Roland avenue.....	5	1	2	8
Riverside avenue.....	3	2	.....	5
Railroad avenue .....	3	.....	1	4
Richland .....	1	.....	.....	1
Rogers avenue.....	1	.....	1	2
Ridgely .....	3	.....	.....	3
Reese .....	1	.....	.....	1
Rose Hill.....	.....	1	.....	1
Robert .....	.....	1	.....	1
Riggs avenue .....	.....	1	.....	1
Ringgold .....	.....	.....	1	1
Randall .....	1	.....	.....	1
Rayner avenue.....	.....	3	.....	3
Richardson .....	.....	1	.....	1
Rock.....	1	.....	.....	1
Race .....	2	.....	.....	2
Stricker .....	7	4	1	12
St. Paul .....	5	1	2	8
Spring.....	3	8	.....	11
Stafford .....	1	.....	.....	1
Second avenue.....	4	.....	.....	4
Saratoga.....	9	.....	2	11
St. Peter.....	.....	.....	1	1
Sargeant.....	2	.....	.....	2
<i>Carried forward</i> .....	696	386	116	1,121

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	696	386	116	1,121
Spruce alley .....			1	1
Salem .....	3			3
Sharp .....		2		2
Stockholm... ..	5			8
Schroeder .....	6	1	1	8
Shuter .....	2		1	3
Smallwood .....	1			1
Somerset .....	2	1		3
Scott .....		1		1
St. Ann .....		1		1
Stone Hill .....	2			2
Sarah Ann .....	1			1
Stiles .....	1			1
Stevenson .....	1			1
Twenty-eighth .....	1	1		2
Townsend .....	2	1	1	4
Third avenue .....	4			4
Twenty-seventh .....			1	1
Twenty-third .....	3	1	1	5
Trinity .....	1			1
Thirty-fifth .....	1	1		2
Twenty-second .....	3			3
Twentieth .....	3		1	4
Thames .....	1			1
Twenty-first .....		1		1
Turner Place .....	2			2
Tremont avenue .....		1		1
Twenty-ninth .....	1			1
Thomas avenue .....			1	1
Twenty-fourth .....	1			1
Twenty-sixth .....	1			1
Union avenue .....	1			1
University Hospital .....			10	10
Vinion avenue .....	1		1	1
Vine .....	1	1		2
Valley .....		1		1
Wolfe .....	16	3		19
Westphal .....	1			1
Washington .....	8	14	1	23
Wirt .....		1		1
Wedgecliff Cottage .....			1	1
<i>Carried forward</i> .....	772	418	137	1,292

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	772	418	137	1,292
Woodley .....			1	1
Woodyear .....	7			7
Williams .....	4			4
Webster Court .....			1	1
Wattermyer Court .....	1			1
Watson .....	1	1		2
Walker .....	1			1
Water .....	1			1
Walbrook avenue .....	4			4
West .....	3			3
Wilson .....		2		2
White .....	4			4
Willow .....	1	2		3
Wilkens avenue .....	5			5
York road .....	1	1	1	3
<b>Totals</b> .....	<b>805</b>	<b>424</b>	<b>140</b>	<b>1,334</b>



## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	696	386	116	1,121
Spruce alley .....			1	1
Salem .....	3			3
Sharp .....		2		2
Stockholm .....	5			8
Schroeder .....	6	1	1	8
Shuter .....	2		1	3
Smallwood .....	1			1
Somerset .....	2	1		3
Scott .....		1		1
St. Ann .....		1		1
Stone Hill .....	2			2
Sarah Ann .....	1			1
Stiles .....	1			1
Stevenson .....	1			1
Twenty-eighth .....	1	1		2
Townsend .....	2	1	1	4
Third avenue .....	4			4
Twenty-seventh .....			1	1
Twenty-third .....	3	1	1	5
Trinity .....	1			1
Thirty-fifth .....	1	1		2
Twenty-second .....	3			3
Twentieth .....	3		1	4
Thames .....	1			1
Twenty-first .....		1		1
Turner Place .....	2			2
Tremont avenue .....		1		1
Twenty-ninth .....	1			1
Thomas avenue .....			1	1
Twenty-fourth .....	1			1
Twenty-sixth .....	1			1
Union avenue .....	1			1
University Hospital .....			10	10
Vinion avenue .....	1		1	1
Vine .....	1	1		2
Valley .....		1		1
Wolfe .....	16	3		19
Westphal .....	1			1
Washington .....	8	14	1	23
Wirt .....		1		1
Wedgecliff Cottage .....			1	1
<i>Carried forward</i> .....	772	418	137	1,292

## FUMIGATIONS FOR YEAR CLASSIFIED BY STREETS—Con'd.

STREETS.	Diphtheria.	Scarlet Fever.	Miscellaneous.	Total.
<i>Brought forward</i> .....	772	418	137	1,292
Woodley .....			1	1
Woodyear .....	7			7
Williams .....	4			4
Webster Court .....			1	1
Wattermyer Court .....	1			1
Watson .....	1	1		2
Walker .....	1			1
Water .....	1			1
Walbrook avenue .....	4			4
West .....	3			3
Wilson .....		2		2
White .....	4			4
Willow .....	1	2		3
Wilkens avenue .....	5			5
York road .....	1	1	1	3
Totals .....	805	424	140	1,334

## FUMIGATIONS CLASSIFIED BY DISEASES.

Years Compared.	1901	1902
Bright's disease.....		1
Cancer.....	1	5
Chickenpox.....	1	3
Diphtheria.....	1,042	816
Erysipelas.....	14	2
Gangrene.....		1
Leprosy.....	1	
Lockjaw.....		1
Measles.....	8	12
Mumps.....	1	
Paralysis.....	1	
Pneumonia.....		2
Scarlet fever.....	320	422
Smallpox.....		14
Septicemia.....		2
Sore throat.....	1	
Tuberculosis.....	58	76
Typhoid fever.....	10	15
Unknown.....	5	5
Whooping cough.....	2	1
Total.....	1,465	1,378

## RESULTS OF FUMIGATIONS.

Years Compared.	1901	1902
Negatives.....	832	1,018
Positives.....	288	224
Unreturned tubes.....	324	132
Returned empty.....	21	4
Total.....	1,465	1,378

## FOOD PURCHASED.

Owing to the quarantining Smallpox and Diphtheria premises during the years the Department supplied food for the quarantined, purchasing same as follows:

	1901	1902
Wm. F. DeKalb.....	\$13 00	.....
Evans & Co. ....	6 71	.....
Fishel & Wright .....	86 78	\$140 67
Mrs. Roemer.....		3 78
J. H. Cronhardt.....		6 72
J. P. Benson's Sons.....		6 37
S. Funk.....		2 47
Economy Meat Co. ....		1 85
*J. B. Weilage.....		116 40
*Hotel Lexington.....		74 35
Totals .....	\$106 49	\$352 61

\*This \$190.75 was for food furnished the twenty-four suspects detained at Detention Hospital, together with meals furnished their guards, which leaves only \$161.86 expended by the Department for the forty-two inmates quarantined in private houses, against \$106.49 for 1901, or only \$55.37 more in 1902 where there was thirty-five cases of smallpox against fourteen in 1901.

## COMPARATIVE STATEMENT—COFFINS COST.

MONTHS.	1900	1901	1902	Remarks.
January ....	\$61 65	\$61 80	\$3 80	Saving in cost in 1901 over 1900... \$520 93
February ...	63 05	14 05	2 70	
March .....	47 95	13 30	3 80	
April .....	90 40	19 00	.....	Saving in cost in 1902 over 1901... 567 38
May... ..	54 70	7 60	1 90	
June .....	57 05	17 60	5 75	
July .....	68 45	36 40	1 80	.....
August . ...	67 70	3 80	.....	
September ..	54 95	1 90	.....	
October ...	48 73	10 00	.....	.....
November...	56 65	.....	.....	
December...	48 90	3 80	123 05*	
Totals ....	\$710 18	\$189 25	\$142 80	Total saving. ....\$1 088 31

\*Amount paid in lump July to December, 1902, inclusive, leaving enough coffins on hand to last until June 30, 1903.

## GUARD EXPENSES.

The following persons were employed at various times during the year for Special Guard Duty in cases Smallpox and Diphtheria, where it was necessary to quarantine the other inmates.

	1901	1902
B. F. Andrews .....	\$ 53 50	\$ 138 49
Patrick Duff .....	30 25	.....
Theo. Eichoff .....	176 90	321 00
Geo. F. Frazier .....	4 00	314 60
H. M. Hunter .....	9 25	30 00
Geo. R. Royston .....	50 75	.....
W. H. Wooden .....	4 75	51 47
A. Reinhardt .....	.....	241 01
Wm. McCormick .....	.....	95 51
W. P. Stafford .....	.....	87 25
Lewis Golden .....	.....	107 60
Chas. McKnabb .....	.....	7 25
N. Bailey .....	.....	95 75
C. H. Burrows .....	.....	131 95
E. V. Dunn .....	.....	28 88
John Walker .....	.....	86 75
H. C. Livingston .....	.....	166 60
Peter Bunn .....	.....	3 50
John Luck .....	.....	77 33
J. B. Scott .....	.....	2 85
	<b>\$329 40</b>	<b>\$1,987 79</b>

## DISEASES GUARDED, Etc.

And Respective Expenses from above.

	1901	1902
Diphtheria .....	150 40	170 18
Scarlet fever .....	98 62	35 77
Smallpox .....	53 75	1,602 06
Erysipelas .....	.....	30 00
Other diseases .....	.....	5 89
*Burning mattresses .....	.....	24 00
*Fumigations .....	21 68	5 13
*Duty on dead wagon .....	10 00	114 76
	<b>329 40</b>	<b>1,987 79</b>

\*The guards also did these things when necessary.

## LIST OF SMALLPOX PATIENTS—1902.

NAMES.	Date Received.	Date Discharged.	Date Died.	Where From.	Born.	Color.	Age.
Benjamin Hawkins...	Feb. 2	Mar. 12	.....	219 Spring street.	N. Carolina.	B.	23
Henry Wilson.....	" 3	" 26	.....	Friendly Inn.	S. Carolina.	"	24
Thomas Berry.....	" 3	Feb. 26	.....	"	Jamaica.	"	20
James Edison.....	" 5	Mar. 12	.....	Steamship "Vedamore."	Nebraska.	"	43
Charles Hall.....	" 5	Feb. 26	.....	" "Jessup."	S. Carolina.	"	24
James Tometty.....	" 5	" 26	.....	" "Vedamore."	Ireland.	W.	42
James Higney.....	" 5	Mar. 17	.....	" "Indore."	"	"	29
Martha J. Barrenger..	" 7	" 15	.....	18 W. L. Church street.	N. Carolina.	B.	48
Edgar Stott.....	" 11	" 26	.....	Pennsylvania.	Tennessee.	"	23
George Brown.....	" 16	.....	Feb. 22	106 Market space.	Jamaica.	"	24
George Menze.....	" 17	Mar. 15	.....	256 Roland avenue.	Maryland.	W.	17
Mary Barrenget.....	" 21	" 15	.....	20 E. Little Church street.	N. Carolina.	B.	22
Oliver Allison.....	" 22	" 15	.....	410 E. Pratt street.	Illinois.	W.	39
James Hiland.....	" 26	.....	Mar. 6	Somerset County, Md.	Maryland.	B.	20
W. Roshanowsky.....	Mar. 14	Mar. 29	.....	Steamship "Frankfort."	Russia.	W.	24
John T. Downey.....	" 14	.....	Mar. 27	517 Little Greene street.	Maryland.	B.	60
Edward Hicks.....	" 29	.....	April 7	Howard County, Md.	Virginia.	B.	55
James Small.....	" 30	.....	" 7	Camden and Light streets.	Baltimore.	"	81
King H. Wall.....	" 30	May 3	.....	206 Rogers avenue.	N. Carolina.	"	28
Albert Sumner.....	April 12	" 17	.....	Independence Camp, Pa.	"	"	26
Asa Carter.....	" 21	.....	May 7	Sparrows Point.	Virginia.	"	20
Mamie Shepard.....	" 24	May 10	.....	1631 Pierce street.	"	"	24
James J. Toner.....	" 29	June 14	.....	427 Saratoga street.	Dist' Colum.	W.	37
Charles Hicks.....	" 30	May 10	.....	1631 Pierce street.	Virginia.	B.	34
James Town.....	May 6	" 24	.....	Detention Hospital.	"	"	20
Albert Epps.....	" 6	" 31	.....	"	"	"	23
George Scott.....	" 6	" 31	.....	"	"	"	21

George E. Wilson.....	"	9	June	7	.....	1323 Wilcox street.	Maryland.	W.	65
Benjamin Latham.....	"	12	"	14	.....	Schooner "C. E. Berger."	N. Carolina.	B.	24
George W. Knight.....	June	16	"	9	.....	Sparrows Point.	Virginia.	"	21
Ellen Tyler.....	July	26	Aug.	16	.....	1004 Linden avenue.	"	"	27
Paul Goodrum.....	Aug.	28	.....	Sept.	1	Pungy "C. C. Fallin."	Dist. Colum.	"	16
Thomas Redding.....	Sept.	6	Nov.	3	.....	"	Virginia.	"	22
Thomas Reynolds.....	"	15	Oct.	13	.....	Johns Hopkins Hospital.	"	"	23
*Luther H. Pettijohn..	Dec.	29	.....	April	16	Maryland General Hospital.	Delaware.	W.	22
Joseph Farl.....	.....	.....	.....	.....	.....	Baltimore City Hospital. Sent to Quarantine by Department am- balance for burial.	New York.	"	28

\* Still at Quarantine.



The following premises were quarantined, from which had been taken a smallpox case each to the Quarantine Station down the river, viz:

---

517 S. Greene street.....	9 persons.
1031 N. Vincent alley.....	7 "
427 Saratoga street.....	6 "
1323 Wilcox street.....	2 "
772 Dover street.....	4 "
800 China street.....	5 "
1004 Linden avenue.....	2 "
110 Chestnut street.....	7 "
<hr/>	
Total.....	42 persons.

## CLOTHING FUMIGATED AND RETURNED OWNERS.

Articles.	Number.	Articles.	Number.
Aprons .....	8	Night shirts .....	9
Blankets (pair) .....	4	Napkins .....	27
Basques .....	6	Neckties .....	23
Bolsters .....	3	Overalls .....	3
Bolster cases .....	8	Overcoats .....	7
Belts .....	8	Portieres (pairs) .....	1
Bonnets .....	3	Pantaloons (pairs) .....	56
Boas .....	1	Petticoats .....	28
Chemise .....	1	Pulse warmers .....	1
Carpets .....	3	Pillows .....	9
Coats .....	30	Pillow cases (pair) .....	9
Collars .....	45	Pin cushions .....	1
Clothes (suits) .....	4	Prayer books .....	1
Comforts .....	10	Rugs .....	2
Children's suits .....	22	Spreads .....	2
Caps .....	5	Skirts .....	23
Corsets .....	6	Shirts .....	41
Corset covers .....	8	Sheets (pairs) .....	16
Curtains (pair) .....	15	Stockings (pairs) .....	26
Cuffs (pairs) .....	5	Suspenders (pair) .....	3
Canopies .....	1	Sweaters .....	1
Dresses .....	25	Sashes .....	1
Drawers (pairs) .....	54	Shawls .....	1
Dolls .....	1	Table scarfs .....	3
Feather beds .....	2	Towels .....	12
Flannel (pieces) .....	7	Trunks .....	6
Gloves (pairs) .....	3	Table cloths .....	4
Hair (bundles) .....	1	Under shirts .....	21
Hair cloth (yards) .....	1	Uppers (pair) .....	1
Handkerchiefs .....	60	Underwear (pair) .....	4
Hats .....	15	Vests .....	218
Hoods .....	1	" blacks and linings .....	58
Lace (piece) .....	1	" trimmings .....	36
Lining (piece) .....	4	" collars .....	28
Mantel scarfs .....	18	" pockets .....	20
Mattresses .....	4	Waists .....	55
Matting .....	1	Wrappers .....	4
Muffs .....	1		

REPORT OF THE  
CLOTHING, ETC., DESTROYED.

Articles.	Number.
Aprons.....	1
Bolsters.....	8
Blankets.....	12
Clothes (suits).....	9
Comforts.....	14
Carpets.....	2
Curtains.....	5
Cuffs (pairs).....	7
Corsets (pairs).....	1
Corset covers.....	1
Dresses.....	6
Drawers (pairs).....	5
Feather beds.....	2
Flannel (pieces).....	2
Hats.....	7
Hassocks.....	1
Handkerchiefs.....	14
Jackets.....	1
Lounges.....	1
Lace (yards).....	10
Mattresses (private houses).....	30
" (from steamships).....	32,698
Mantel covers.....	1
Matting (pieces).....	8
Neckties.....	1
Napkins.....	9
Night gowns.....	8
Overcoats.....	2
Petticoats.....	5
Pillow cases.....	6
" shams.....	3
Pillows.....	29
Pantaloon (pair).....	1
Quilts.....	1
Stockings (pairs).....	20
Spreads.....	2
Sheets.....	16
Shoes (pairs).....	2
Shirts.....	13
Sacques.....	1
Towels.....	17
Table cloths.....	3
Trunks.....	1
Undershirts.....	10
Vests.....	1
Wrappers.....	11
Waists.....	4

## ANATOMY BOARD.

Statement of bodies turned over to this Board by the Commissioner of Health, under Act of the General Assembly of Maryland, Chapter 168, 1882, to be used only to promote Medical Science in the State of Maryland and the medical schools of Baltimore City:

*January 1st to December 31st, 1902, Inclusive.*

	1901.	1902.
Adults .....	357	301
Between 1 and 5 years .....	15	22
Under 1 year .....	244	249
Still births .....	127	172
Total .....	<u>743</u>	<u>744</u>
Males .....	464	454
Females.....	279	283
Unknown sex.....	...	7
Total.....	<u>743</u>	<u>744</u>
Whites .....	172	229
Blacks .....	560	510
Unknown .....	11	5
Total.. .....	<u>743</u>	<u>744</u>

## WHERE FROM.

	1901	1902
Bay View .....	107	97
Baltimore City Hospital .....	31	33
Baltimore City Jail .....	2	3
Canton Police Station .....		1
Ellicott City .....		2
Garrett Hospital .....	2	3
Homoepathic Hospital .....	7	8
Home of Mothers and Infants .....		2
Hebrew Hospital .....		1
Johns Hopkins Hospital .....	56	54
Franklin Square Hospital .....		1
Maternite Hospital (115 W. Lombard street) .....	10	11
Morgue .....	89	12
Maryland General Hospital .....	37	41
Miscellaneous (private houses) .....	230	268
Mt. Wilson, Md. ....		4
Nursery and Child's Hospital .....		30
Northern Police Station .....	3	3
Northeastern Police station .....		2
Northwestern Police station .....	6	7
Penitentiary .....	4	13
Provident Hospital .....	1	1
St. Elizabeth's Home .....	107	87
Samaritan Hospital .....	4	
St. Agnes Hospital .....	1	6
St. Joseph's Hospital .....	3	14
Southern Police Station .....	2	5
Southwestern Police Station .....	3	1
University Hospital .....	36	20
Union Protestant Infirmary .....		1
Western Police Station .....	2	2
West End Maternite Hospital .....		1
Totals .....	743	744

## DISPOSITION.

	1901	1902
Baltimore Medical College .....	43	52
Baltimore University College.....		14
College Physicians and Surgeons.....	258	316
Homoeopathic College.....	3	3
Hebrew College ..		1
Johns Hopkins Medical College ..	395	286
Maryland Medical.....		19
1113 Madison avenue .....		1
University of Maryland.....	40	50
Woman's College.....	2	2
Laboratory, 1 }	2	.. ..
Destroyed, 1 }		
Totals .....	743	744

## TOTAL NUMBER HANDLED BY HEALTH DEPARTMENT.

	1901.	1902.
Buried in Potter's field .....	53	21
Surrendered to friends for burial .....	166	180
Transferred to Anatomy board .....	743	728
Totals....	962	929

Respectfully submitted.

GEO. C. WEDDERBURN,  
*Index Clerk.*

## Report of the Burial Permit Clerk.

JAMES BOSLEY, M. D., *Commissioner of Health:*

DEAR SIR—I hereby respectfully submit the report of the work done by the Burial Permit Clerk for the year ending December 31, 1902.

The following table exhibits a summary of the various kinds of permits issued during the year:

1902. MONTHS.	Burial Permits. City.	Burial Permits. Transit.	Burial Permits. Still births.	Burial Permits. Shipping.	Burial Permits. Disinter.	Removal Per- mits.	Total.
January .	912	61	61	87	18	229	1,368
February	816	69	65	65	7	204	1,226
March ...	849	72	43	72	28	237	1,301
April ....	829	61	57	63	53	198	1,261
May.....	804	74	66	82	57	213	1,296
June .....	874	72	54	88	27	263	1,378
July .....	1,052	108	68	113	16	264	1,621
August ..	915	90	47	75	19	223	1,369
Septemb'r	812	80	55	76	41	197	1,261
October ..	742	72	71	68	55	185	1,193
Novemb'r	720	64	33	71	46	176	1,110
December	928	78	66	101	15	201	1,389
Total ..	10,253	901	686	961	382	2,590	15,773

During the year there were received from cemeteries and transportation companies 13,183 burial, disinter and shipping permits, which have been affixed to Certificates of Death, and applications for burial, and the same have been filed for record.

Respectfully submitted.

HARRY C. ANDREWS,  
*Burial Permit Clerk.*

BALTIMORE, January 1, 1903.

TO JAMES BOSLEY, M. D.,  
*Commissioner of Health.*

DEAR DOCTOR—I beg to submit to you eleven maps to show the localities where deaths due to infectious and other diseases have occurred during the year 1902, and also the location of houses in which scarlet fever, diphtheria and typhoid fever have developed. First of all I call your attention to map showing deaths from tuberculosis.

#### TUBERCULOSIS.

This map is one of a series made for the purpose of determining as much as possible whether this cause of death is more marked in some parts of the city than in others, and also to ascertain by the original card records, from which the map record was made, whether or not certain houses were more infected than others.

It is unfortunate that we must depend on the death records for this information, for as yet cases of tuberculosis are so seldom reported (compared with their actual number), that it would be useless to depend upon them for full information.

Of the total number of deaths, 1,206, the colored people furnished 376, or a little over one-third. The colored population is just about one-sixth of the total population. Death from this disease amongst this race is therefore twice as great as amongst the white people. The cause of this is in part at least due to their poor homes and imperfect treatment. The prevalence of this disease amongst the colored people is a great menace to our white population, due to close association in their vocation as servants and nurses. In this connection please note that there were 23 drivers, 14 laundresses, 24 seamstresses and 105 servants, all of whom were colored.



Little at this time can be said about the contributing causes of death from this disease amongst the white people. Poor dwellings and crowded houses doubtless are important factors, but there is another which at this time deserves special mention, *i. e.*, their place of work. Please note that there were 29 merchants and 69 clerks victims. While we can not say positively that the disease was contracted at their places of business, yet certainly everyone must know that many offices and accounting rooms are not well calculated to promote the health of the workers. This condition of affairs has frequently resulted from a disproportionate growth of the business and accommodations for the employes. Doubtless the same can truthfully be said of the working places of artisans and mechanics. Evidence is certainly sufficient to warrant the employment of skilled inspectors by this Department to investigate conditions above referred to.

Finally I call attention to the number of children (79), who died from tuberculosis while under five years of age, and also the number (160), between the ages of five and twenty years; *i. e.*, the school years; coupled with this note that 19 school teachers died during this year.

#### PNEUMONIA.

There is shown this year a decrease in the number of deaths, but it is notable how high the death rate is amongst the negroes. More than a third of the deaths from pneumonia occur in this race. Please note the ages at deaths: 147 died under one year, 158 died between one and five years, making 305 under five years. I cannot help believing that the very many cases were broncho-pneumonia and have as a primary cause either measles or tuberculosis.

## BRONCHO-PNEUMONIA.

Capillary bronchitis as classified with broncho-pneumonia. Nearly one-half of the deaths occurred in children less than one year of age. Between the ages of one year and five years there occurred 76 deaths. Many of these we believe had as a primary cause measles or whooping cough.

Taking the three diseases, *i. e.*, tuberculosis, pneumonia and broncho-pneumonia, we find that in 1902 they caused a total of 2,225 deaths, nearly one-fourth of the deaths from all causes. This certainly presents a great field for work in lessening our death rate. To do this work we must have enlarged facilities.

## ALIMENTARY DISEASES.

This map has not been correctly named because I have included only deaths due to invasion of the stomach and intestines in children under 5 years of age. Please note, however, that almost all of the 741 deaths occurred under one year of age, *i. e.*, the milk feeding age. In the list of diseases are gastritis, gastro-enteritis, enteritis, enter-colitis, colitis, diarrhoea, summer complaint and cholera infantum; but I have not included deaths due to marasmus and inanition which caused 695 deaths. We feel confident that a large percentage of this number should have been classed with Alimentary diseases, and that it would be conservative to state that at least 1,000 children died of bowel troubles.

Naturally we look to the milk for an explanation of this mortality; but in doing so, one should be careful not to assert very positively, at this time, that the milk received into our city is the cause of the high mortality.

This we know, that there has been during the past five or six years a very great improvement in our milk supply, and that while formerly it was common to find milk with less than three per cent. butter-fat and thirteen per cent. total solids (which was spilled) that now it seldom is found so low, but

rather we find four, five and six per cent. butter-fat, with fourteen and fifteen per cent. total solids. Therefore there is probably less addition of water than formerly, but we have even a greater death rate than when the milk was poorer. We have found, however, that a great dilution of the milk occurs in many small shops, and a still further addition by the people by the addition of water, which probably is the source of so much bowel infection.

In this connection I beg to state, that in the region of the city included in the Second and Third wards where there are so many deaths from entero-colitis, that the children are breast-fed, and if any milk additional is given, it appears that condensed milk is used. How extensive this custom is I am not able to state, but Dr. G. W. Lehman, by our direction, is endeavoring to ascertain the truth.

Besides this source of pollution, we know that much damage is apt to be done before the milk leaves the farm, and we respectfully suggest that legislation be obtained so that all dairy farms sending milk to Baltimore should be placed under the control of the Health Department of this city.

Is it not curious that only 168 out of the 741 deaths occurred in colored babies? It might be due to the fact that so many die from lung diseases, and because they are breast-fed.

Dr. Storer, in our Laboratory, and Drs Knox and Bassett, at the Wilson Sanitarium, have been doing excellent work on this subject, and the discovery by the latter of one of the germs causing summer complaint will go a great way in solving the problem of lowering our death rate.

Our card catalogue shows this interesting fact that it often occurred that two, three or four children within the same square would die of the same disease, within the same week, and all at about the same age.

## TYPHOID FEVER.

This preventable disease caused an increase in the number of deaths last year, and yet remained within bounds of the normal annual fluxation. On the map are shown the situation of 1,086 cases, but from the number of deaths, 220, we believe that there were 2,200 cases during the year. By the map you will see that the cases were well distributed over the entire city. We recognize, of course, that many cases were imported, but such a number of cases that is presented on the map and such an equable distribution could scarcely be brought about other than by a common source, and that source is our drinking water. Some recent investigations show that flies and other insects can convey the germ, but that won't account for the cases occurring out of fly-time.

We are pleased to note that the cases seem to be better reported than in former years. Compare the years 1898 and 1902; in the former year only about half the number of cases as in 1902 were reported, and yet there were 192 deaths.

## DIPHTHERIA.

In this map we are able to show by the table attached that we have been able to obtain good results by persistent work against the disease. We fear, however, that the good work accomplished has made people again careless, and by the showing of the last three months of the year there will be an increase in 1903. It is gratifying to note that during the five years from 1898 to 1902 inclusive, there is a steady decrease in the number of cases from 2,079 in 1898 to 972 cases in 1902. But still more gratifying is the decrease in the death rate, which we believe to be due to the early use of antitoxine. In 1898 there were 412 deaths, or a percentage of 19.82, and in 1902 there were 130 deaths, or a percentage of 13.37, a decrease in the death rate of 6.45 per cent.

## SCARLET FEVER.

This disease has been mild for many years, certainly for the past twenty. We have placed a table on the map to show the number of cases by month and year for the past five years. While the number of cases is less than in 1898, yet the number of cases occurring during the months from July to December, inclusive, is greater than in any other year, coupled with the fact that there seems to be a concentration in the Third and Fifth wards, makes the outlook for 1903 somewhat disquieting.

The maps showing the distribution of deaths due to cancer, heart disease, bright's disease and tetanus, have been made to preserve as records and future work.

It was noticed while making the card records of cancer, that it frequently caused death in the same house, but different families, nearly the same date. It also occurred within the same block of houses.

Yours respectfully,

C. HAMPTON JONES, M. D.

*Assistant Commissioner of Health.*

















































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